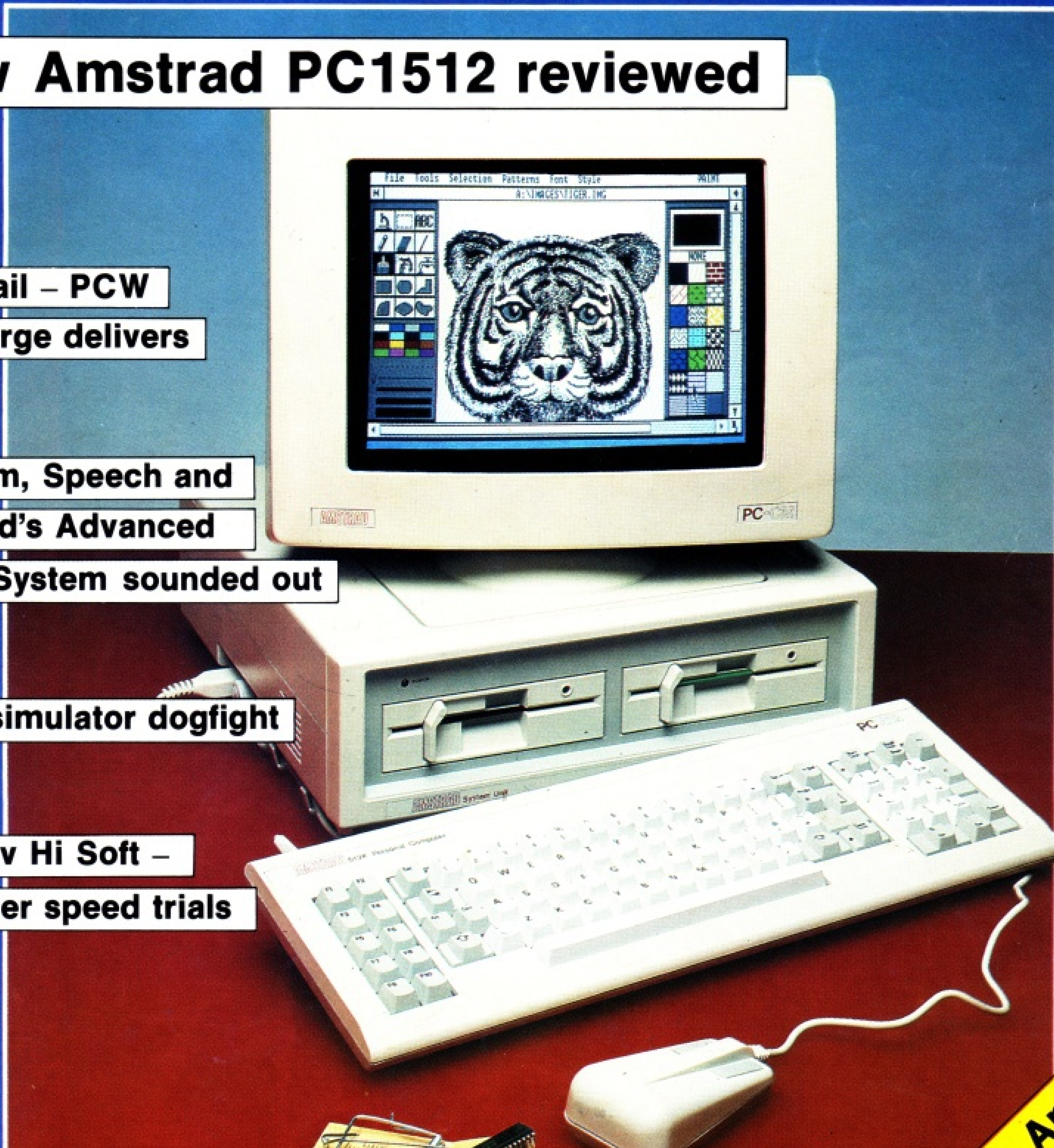
The Official Amstrad Magazine

October 1986 £1.00

AMSTRAD COMPUTER USER



New Amstrad PC1512 reviewed

LocoMail – PCW mailmerge delivers

Amdrum, Speech and Rainbird's Advanced Music System sounded out

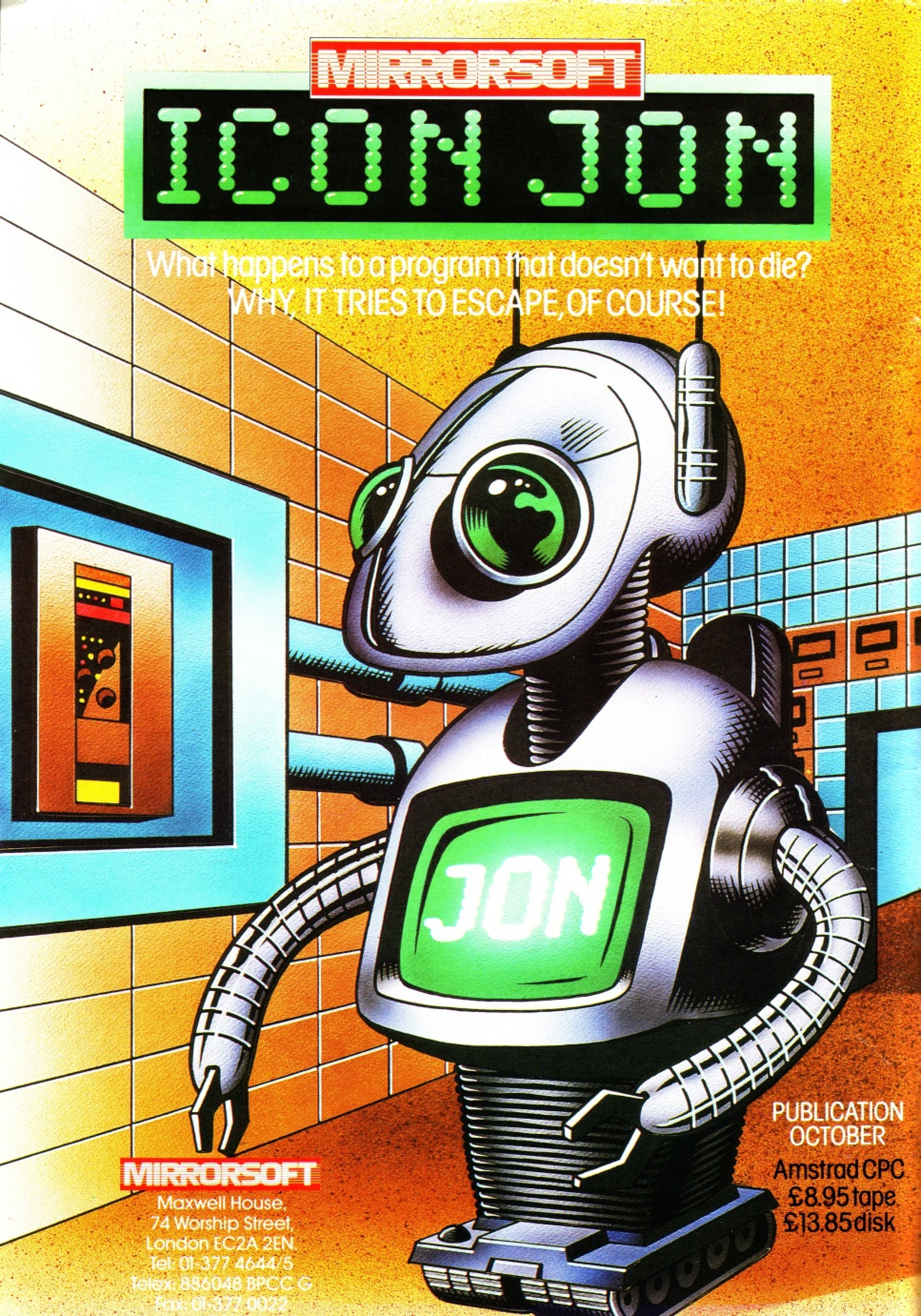
Flight simulator dogfight

Ocean v Hi Soft – Compiler speed trials

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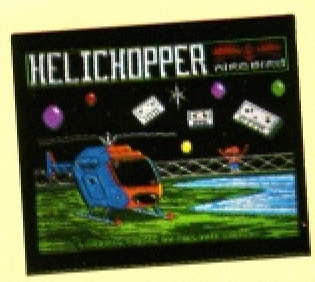
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AMSTRAD COMPUTER USER

The official magazine for all users of Amstrad computers

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ACU/10/86

User News

Amstrad PC 1512 launched . . .



Amstrad has launched the long awaited PC 1512, and it has proved to be a better buy than anyone predicted. The machine is IBM-compatible, comes with 512k RAM and uses a 16 bit 8086 processor running at 8MHz.

This means that the computer is very much faster than the IBM original. It is available in eight different configurations with colour or monochrome monitors, single or dual drive floppy disc drives and 10 or 20Mb hard disc. There are serial and parallel interfaces as standard so printers, modems and a host of RS232 devices can be connected. The clock is battery backed up – so the machine doesn't forget the time when you switch it off.

The Amstrad PC is unusual in having both a joystick port and a mouse as standard, the mouse being essential for using the Gem software you get with the computer.

Two operating systems are supplied with the Amstrad PC: DOS Plus – an improved version of CP/M 86 – and MS-DOS 3.2, the new version of the standard operating system for the IBM PC. Version 3.2 costs more than £100 from IBM. The software supplied includes Gem Desktop, Gem Paint and Locomotive Basic 2.

The most impressive feature of the new PC is the 16 colour graphics mode. This offers as many colours as the 464 Mode 0 but with the high resolution of Mode 2.

One feature which makes a PC compatible so flexible is the expansion slots, which allow the user to add hardware inside the main unit. Two types of card can be added, full length and half length.

The Amstrad PC has room for three full length cards. This may sound restricting when it is compared to the five slots on some machines, but you have to remember that the rivals need extra slots for memory expansion, colour graphics cards, serial and parallel interfaces and a mouse port.

All these are built into the Amstrad as standard, leaving the expansion slots for more esoteric applications. These include modems, memory drives, second processors and a host of special uses.

Unfortunately these cards are often expensive but with the impact of the Amstrad PC we should see prices fall.

In addition to being very good the Amstrad PC is very cheap – for á PC.

The monochrome model with a single drive is £399 and the top of the range micro with a 20Mb hard disc will set you back £949. This is around five times cheaper than a comparable machine.

Amstrad is maintaining its policy of not allowing upgrades from one system to another, but has authorised Dictaphone to do so. You cannot upgrade from a mono system to a colour one but it is possible to add a second floppy disc drive for £149, a 10Mb hard disc for £400 and a 20Mb drive for £500. These prices include fitting.

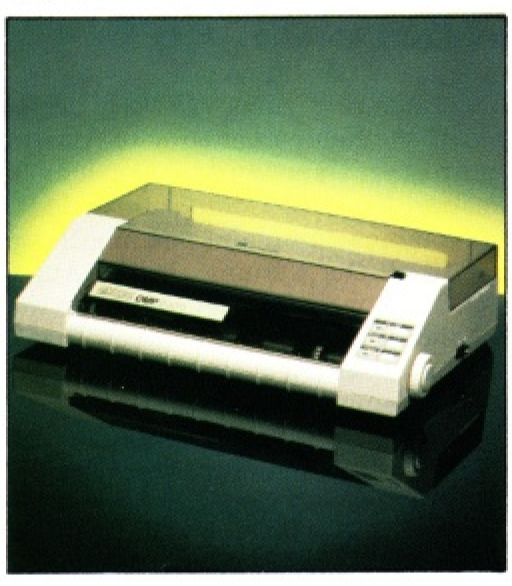
The most useful service Dictaphone offers is a memory upgrade expanding a 512k machine to 640k for just £45. You will find a full review of the Amstrad PC on Page 64 and a review of its new Basic on Page 73.

. . . and a new printer

To complement the Amstrad PC there is a new, old, printer. The DMP-3000 is a PC compatible version of the popular DMP-2000. The new printer has slight differences in the ROM and is coloured to match the Amstrad PC. As with the DMP-2000 it has a good near letter quality mode and bit image graphics.

With a draft quality speed of around 100 characters per second it is a good budget priced machine. The eight bit parallel interface on the PC allows full access to the character set.

The new machine costs £10 more than the DMP-2000 at £155.65. Rumours of a forthcoming wide carriage version cannot be substantiated.



Star of the big Show

The new PC is set to be one of the star attractions at the fifth Amstrad Computer Show.

Its presence has boosted the new product launches scheduled for the event to a record high of more than 200.

Companies are currently working round the clock to ensure they make the deadline – October 3, the opening day at the Novotel, Hammersmith, London.

A survey has revealed that one third of all the innovations on display at the three day event will be for the new machine.

One company alone, Digital Research, will be showing nine products for the PC.

Apart from 1512 versions of four established products – Gem Draw, Gem Write, Gem Graph and Gem WordChart – the company will be launching five new packages.

These are Gem Diary, a page-per-day facility complete with notepad, 11 alarms, and card index file costing £39.99; Gem Fonts and Drivers Pack and Gem Draw Business Library, both priced at £39.95; Gem Font Editor at £99.95; and Gem Programmers Toolkit at £175.95.

Caxton Software also has two new products for the PC. Condor Junior, a relational database and report system suitable for novices, costs £99.99, while Timekeeper, a time management system, is priced at £49.99.

Citadel Products is also aiming to jump aboard the PC bandwagon with a

hard disc which comes with a plug-in card for around £399.

Not that the PC is likely to overshadow the rest of the Amstrad range at the Show.

Both the CPCs and the PCWs will be well represented on the new product front with around 70 for each.

Prominent will be program writing and database utilities for the PCW from Minerva and a new C Compiler from Advantage.

The Show will once again be featuring continuous performances in the Amstrad Theatre, a venue for companies to present their latest offerings in a dramatic setting.

Don't forget the Amstrad Computer Show will be open from 10am to 6pm on Friday and Saturday, October 3 and 4, and from 10am to 4pm on Sunday, October 6.

Beat that!

Response to the Amdrum competition was astounding, which either goes to show how musical Amstrad owners are or how easy the competition was.

Thank you everyone who entered, and just to show they care, Cheetah is offering £2.50 off an Amdrum if you entered the competition. You need to buy the Amdrum direct from them and must have had your entry in before the closing date.

Six people won't want to take up that offer – the winners. They are Michael Pearson of Blackpool, Richard Thompson of Carmarthen, Robin Marrs of Hull, Martin O'Hara of London NW1, Mr R P Mundin of Portsmouth and Stewart Donaldson of Hartlepool. They are already annoying their families and neighbours with their prizes.

New software

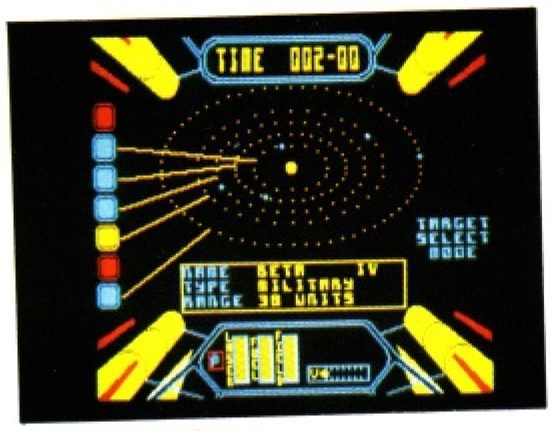
This has been an exciting month for new software. Unfortunately some of the best titles arrived too late for Colin, Nigel and Liz to do their stuff with them. All are games to watch out for in the near future.

Starstrike II

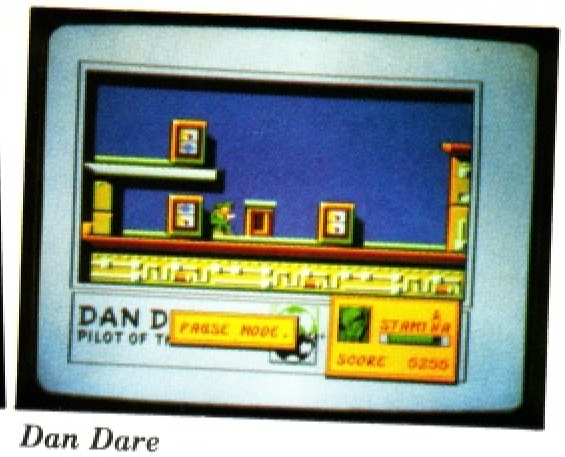
Firebird has signed up Realtime to produce Starstrike II, a space game with the best use of colour we've come across. It uses Mode 1 with shading to produce 20 different colours. There is a Starion space battle sequence, and several original space sequences with in-flight docking and force fields to master.

Dan Dare

Virgin games has been beavering away on Dan Dare for several years. The program has now seen the light of day and every gram of effort has been worthwhile. In the game you have to rescue Digby by exploring an excavated asteroid and then blow the thing up before it crashes into the Earth.



Starstrike II



Dan Dare

De-activators

Ariolasoft has two new titles designed by the people who wrote the game Think! – They Sold a Million and De-activators. In the latter you control some robots roaming around a building. You have to find bombs and throw them out of the window.

You need to plan your moves against time and watch out for hostile 'droids. There are varying gravities in the rooms and transporters to flip you from room to room.

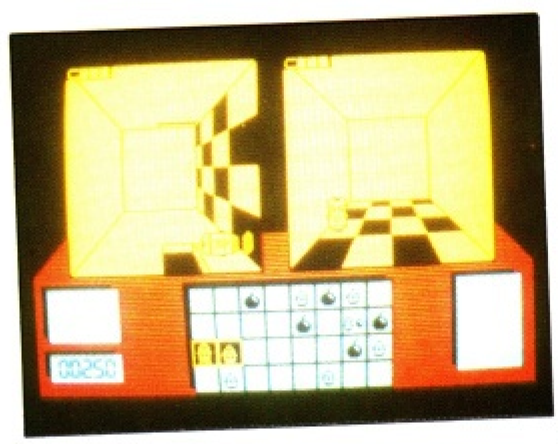
To get bombs through the building it is often necessary to throw them through internal windows from robot to robot.

They Stole a Million

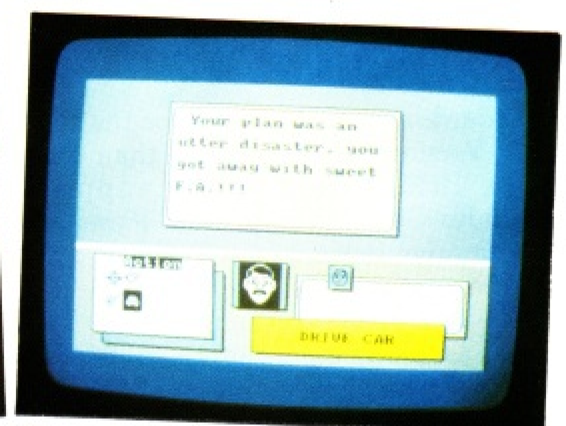
This game is morally unsound. You have to plan robberies and make £1,000,000. You need to speculate to accumulate, and once you have selected your target there are cronies to recruit, plans of the joint to be bought, a getaway car to be hired and a fence chosen.

Then you, as Mr Big, have to plan the blag. You decide what each member of your team should be doing second by second after the raid has started. You execute the job and use the profits to finance the next raid.

Hazards include alarms, security guards and the police. Making the second million is much easier, you just sit back in your South American paradise and write a book about how you made the first million.



De-activators



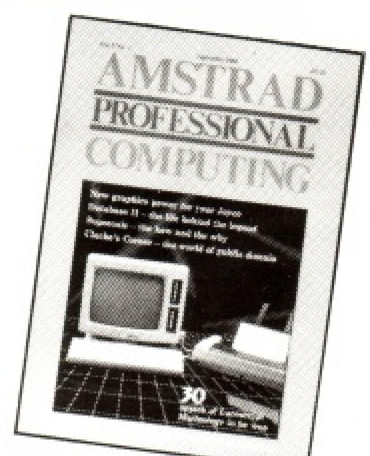
They Stole a Million

Where'd it go?

Ring ring, ring ring. *"Hello. I've just bought the September issue of* Amstrad Computer User *and there was no* Amstrad Business Computing *inside".*

A common complaint one month ago, despite all the warnings in the August mag. This means that lots of people were on holiday, because we all know that no one would miss out on an issue if they could possibly avoid it.

Amstrad Business Computing has gone to pastures new. It has broken free of the ACU staples and taken on a new identity. You will find it on the newstands bearing the title *Amstrad Professional Computing,* and jolly good it is too.



So if you want to catch up on the professional side of Amstrad computing go and buy a copy. It makes its way into the newsagents one week after ACU, so you have time to get your teeth into this magazine first.

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Holiday contest entry form

1. **What did Alan Sugar first start selling?**
   ☐ Hi-fi ☐ Car aerials ☐ Computers
2. **What size discs do the Amstrad range of computers use?**
   ☐ 3″ ☐ 3.5″ ☐ 5.25″
3. **What is the word processor supplied with the Amstrad PCW computer?**
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Amstrad is so successful because (not more than 15 words).

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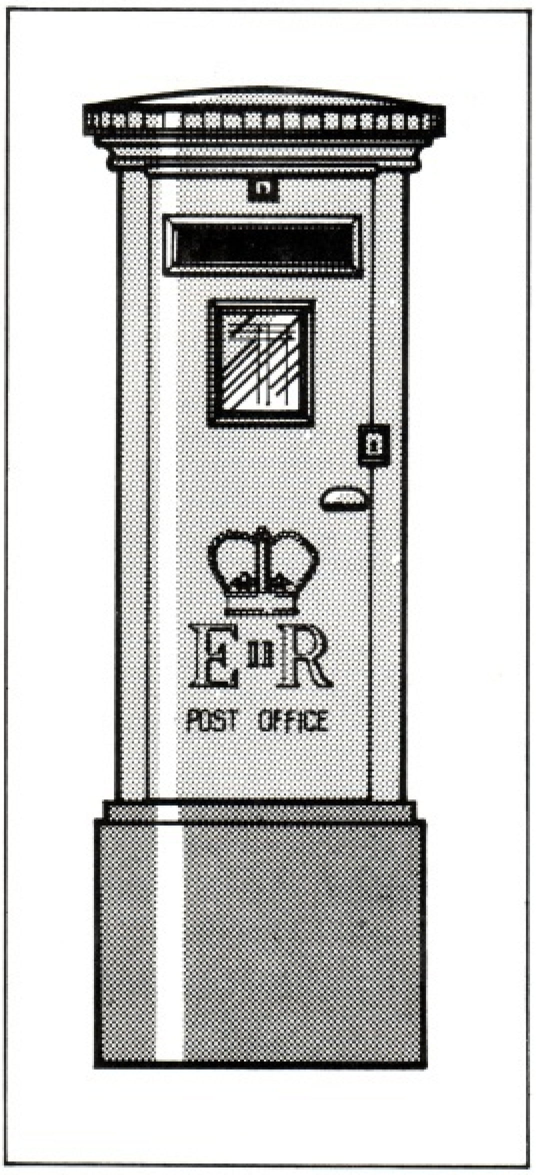
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Write to reply

Please bear in mind that the views expressed herein are not necessarily those of Amstrad or Amsoft. Be assured that all your views are given thorough consideration. This letters section is the Amstrad Computer User's own forum.



Join the club

During an idle hour last night which I spent reading back numbers of your magazine I could not help noticing that in the letters section the same complaint came up several times. This is simply that many people are feeling cut off and on their own as far as their hobby is concerned. Not for them the gregarious pursuits of the Spectrum or Commodore 64 owner, due mainly to having the only or perhaps one of the few Amstrads in their area. It was with this in mind that I decided to offer these poor souls some help, having suffered the same complaint for over a year myself.

What kind of help would be required I have little idea but as a start a postal user club with nominal fees would be a step in the right direction. This decided I have taken it upon myself to try to organise one.

At present the format of the club would be no membership fee, a once monthly – to start – newsletter containing program hints, pokes for arcade games, help with adventures, and perhaps a swap shop area for members.

The above scheme, while practical, stumbled at the very first hurdle in that I was unable to contact these potential members due to your magazine's habit of not printing full addresses. While I understand that this may be a legal requirement I give full permission to publish my address as otherwise there can be no replies.

Gordon Yacomine,
30 Finavon Street,
Dundee, Scotland.

Need to communicate

I was interested to read P.A. McArthur's comments concerning the Cirkit interface/modem package in the May issue.

He mentioned that it was possible to configure the public domain program UKM7 to enable MODEMX file transfer under CP/M but neglected to say how!

If he, or some other genius, could send me details of how to do this I would be eternally in their debt.

R.M. Ford
Oldham
Lancs.

Locoscript tricks

Admirable though Locoscript is in many respects, the authors did not provide well for users having foreign language texts to type. Even the "standard" letters with accents are far from convenient for a touch typist as there is no right hand extra key, but one has to put up with this. More awkward are the "non-standard" characters, though the problems can usually be overcome. Mr Tems (*Amstrad Computer User,* August 1986) will find that if he types his text without accents, then at the end of the line enters "Line Spacing 0" followed by Return, he can insert accents in the appropriate positions, using the spacebar (and Delete key if necessary) to locate them, followed by normal line spacing and Return. The accents will appear underneath the letters on the screen, but in the correct position when printed.

It is a tiresome and inefficient process, particularly if any editing is required after the accents have been inserted, but it should save Mr Tems from wanting to consign his work to his tŷ bach. Moreover, it doesn't work in proportional spacing or with justified margins, and frequent changes between showing and not showing codes will probably prove necessary.

This problem is not confined to foreign languages – it is found in statistical expressions.

Putting a bar over a letter, as in Romanised Japanese script and – probably more commonly – statistics, is even more complicated and involves juggling with half line spacing and the underscore key. If anybody knows of a simpler method, please advise.

Some of us are interested in our word processors to ease our own tasks, not to provide additional intellectual challenge!

G.Edlington,
Sutton Coldfield,
West Midlands.

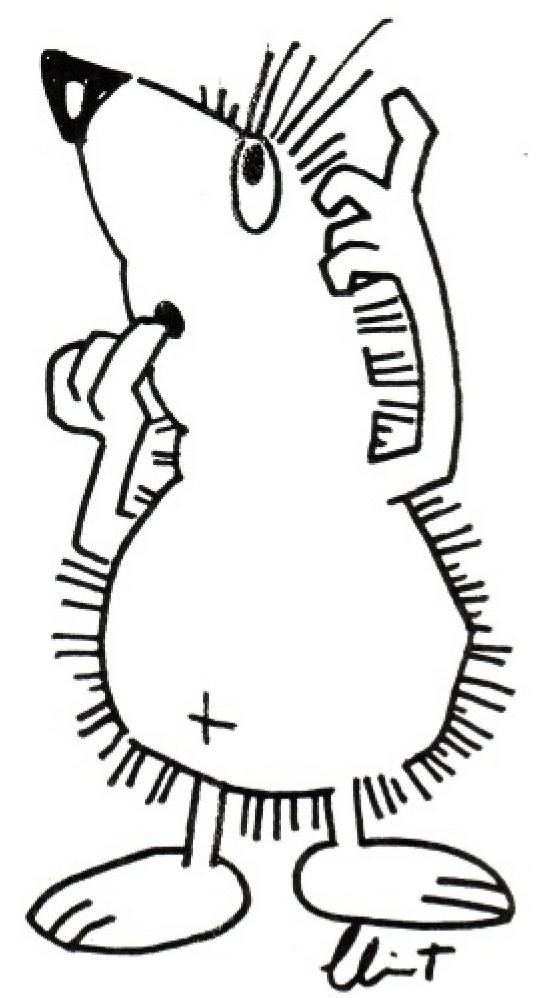
Hedgehog help

I read your review of the game Spiky Harold in the August edition of *ACU.* Can you please tell me were I can buy it?

Is it available direct from Firebird? What is their address?

A.R. Harris,
Stirling

***ACU:** Firebird has moved, and its new address is 74 New Oxford Street, London WC1A 1EU, but you should be able to buy Spiky Harold from a local shop.*



What a rip-off

I really do wish you would stop your persistent disparagement of people who wish to make back up copies of their tapes or discs, or to upgrade from tape to disc. Making a backup copy is not illegal and is not "piracy" as you obviously well know.

You make a number of assumptions which are challengeable, namely that making a program copiable to disc is a licence to print money and this is the method used by "pirates". Also, that this gives "everyone a leg-up in pirating".

Copying programs one by one is tedious, even on disc, and not the preferred method of commercial pirates. It is not cost effective and therefore hardly a licence to print money.

Furthermore, your comment on giving everyone a leg-up in pirating is quite frankly offensive since it presupposes widespread dishonesty which is only kept in check by the software houses that you applaud.

I'm surprised you haven't considered selling *ACU* in coded form available only to those with a special machine to decode it.

B.M.Wadeson,
Northampton.

ACU: *Wrong! Unless the software you have expressly permits you to make a back-up copy then the copyright act, as amended to cover computer software, prohibits you from copying a "substantial part" of a computer program.*

Now since any less than a whole program is no use at all it is effectively illegal to copy software.

Copying software may be laborious but if you are a schoolboy who gets £3 a week pocket money it is much easier than saving up.

The death of a disc

In the July and August issues of *ACU* there is an advert for SJB, the Master Disk Distributor". So I gave this advert to a friend at college who wished to buy me a gift. The order was for 10 Amsoft 3in CF2-DD for the drive B of my 8512 computer.

Imagine my confusion to be told that these discs are "no longer manufactured" – but Amsoft said to buy the 3in CF2 discs and to format those to suit drive B. My colleague bought 10 CF2 discs.

What the heck are they trying to say? I am new to Amstrad and must say that I cannot understand what is being said about drive B CF2-DD discs. My computer is only about three months old.

B. Gill,
Huddersfield
West Yorkshire.

ACU: *Amstrad originally intended you to buy one type of disc for drive A and another for drive B (PCW owners only).*

It then discovered that the discs you were using in drive A were good enough to work in drive B, if you used the CF2DD format option, so there was no need to buy and use the more expensive discs. Perhaps CF2 DD's will become collectors' items?



Seeing green

A plea to all software houses – why do you not all take the time to put green screen options within your games? It would be of great help.

Now another exciting question. Is there any way in which Green Screen monitor owners – like me – can update to a colour monitor system for an extra fee *(No - Ed)* or do we all have to buy modulators and then a new TV or monitor? *(That's right - Ed)*

Next, an interesting fact on Amstrad software titles - the most common letter for a title to begin with is S and the most uncommon is X. Now wasn't that extremely interesting?

Andrew Duff,
Ross-shire,
Scotland.

Tape to Disc – take II

I have just read your August edition and with reference to the letters from Messrs Boyle and Parsons concerning disc software, I must admit your replies to them have left me somewhat bemused.

Firstly you say in your reply to Mr Parsons: "If there is the demand then the product should be cheap ...". What about the current situation regarding disc software?

Before the advent of the 6128 the average price of a cassette game was about £8 or £9 and disc software was priced around £12 to £13. Now however, although the average price of cassette games has remained the same or dropped slightly, the price of disc software has gone up to £15 or £16. So your argument about increased demand bringing about a price reduction is a load of rubbish in this case.

I would like to know how you or the software houses can justify the price difference between cassette and disc based software. Copying costs cannot be that much different between disc and tape. *(They are - Ed.)*

Surely if I can buy a tape game for £9 and a single blank disc for £4, why do the software houses insist on adding another £2 on the price? It is obvious that the software purchaser is being conned out of a great deal of money in this case.

In your reply to Mr Boyle you say that by making programs easy to copy on to disc that this facilitates piracy. Why should someone who has upgraded from a 464 to a 664 or 6128, for example – like myself and many other people – then be expected to buy the disc versions of the same programs they may have already purchased?

My experiences with software regarding transferring programs to disc have been similar to those of Mr Boyle. Some either do not bother to reply to enquiries or they require larger fee for doing this, often beyond the means of many people

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who have a number of programs to transfer.

You also say in your reply that you applaud any measures taken by software houses to prevent piracy, but on the other hand, why should the computer user be fleeced by the software houses? Surely if disc software were more realistically priced then piracy, while never being entirely cured, would be lessened. Besides which, if Ambyte can offer disc software at tape prices, why can't the other software houses?

S.R. Kemp,
Redditch,
Worcs.

ACU: *We agree that software houses should be more cooperative about offering tape to disc upgrades but since a disc costs a software house 10 times as much as a tape discs are very much more expensive to produce.*

Ambyte reduces this cost by putting more than one program on a disc and its rules which stipulate that you must spend at least £15 on a disc allow the company to offer software at tape based prices.

Break 14 for a problem

I have a problem which manifests itself in the form of a CB radio. The location of the CB is right next door and there is a large aerial hanging out of the window.

Now when he switches his CB on it makes my CPC464 plus disc drive and printer malfunction. I always know when he is on because it makes the screen jump violently up and down and makes it impossible to use it.

I have contacted the Post Office, BT, and the Citizen's Advice Bureau, all of which – with the exception of the last one – were not interested and advised me to contact the Department of Trade and Industry, radio and interence service.

So I did and they cannot do anything because it is not affecting my TV. Even the Citizens Advice Bureau could not stop him.

Is this all I can do? Has anyone else reading this had the same problem and possibly solved it? If so can you please, please tell me what you did or else I think I will commit murder or something!

N.C.Dart
Barnstaple
North Devon.

ACU: *Hold on! The people who deal with radio interference are the Home Office. Assuming that your neighbour is using a legal 4 watt set-up there may be little you can do – except sit back happy in the knowledge that your Amstrad probably has a similarly adverse affect on the CB.*

If you have extended the lead between the computer and the monitor then that extra wire could cause problems. You may be best off moving the computer within your house.

The new Amstrad

Amstrad denies that there is a new computer, but what do I spy in August's edition of *ACU*? On page 13 RSC Limited advertised the Amstrad IBM PC for either £399 or £499.

If there is no new computer then how come these people are advertising it? Fishy, eh?

Jason Anderson,
Portmead,
Swansea.

ACU: *Now you know that there is a new Amstrad, but RSC was guessing. They wrongly said that the new machine was only 128k. When we telephoned the company they claimed that it did not have any expansion slots, there was no mouse and that it only ran MSDOS. They got the price for a colour system wrong and made lots of other mistakes so they must be pleased with what Mr Sugar has announced.*

Letter from MicroPro

I read with interest and surprise the letter from Mr Parsons (*ACU* August 1986) concerning the price of Wordstar, and your editorial comment.

Let me try to put the record straight. Wordstar for the Amstrad, known as Pocket Wordstar, costs £49.94. The De Luxe version, which includes a spelling checker, costs £69.95.

These customised packages, which contain all the features of the original Wordstar, are easily available through both dealers and retail chains. I am unaware that Dixons give it away free. I hope W.H. Smiths and Boots don't find out!

I would agree on one point – good reliable business software is expensive to write, expensive to market, and expensive to support. The reason that we can sell Pocket Wordstar at such a low price is threefold. Firstly it is a fully developed program, whose development costs are recovered. Secondly it is so well proven that support is minimal, there are practically no bugs left. Finally, we hope, large numbers will be sold.

Pricing software is not an easy exercise at the best of times. I do not believe that MicroPro made a mistake in setting the price of Wordstar at £295 originally – within the context and at the time, that price gained wide acceptance. Times change, markets shift, and we at MicroPro are always flexible enough to attune our prices appropriately. I hope Mr Parsons would agree that spending £70 for the world's best word processor hardly qualifies him as a sucker.

Robin Oliver,
Managing Director,
MicroPro, London.

Magikal advice

I have just bought The Price of Magik from Level Nine. I loaded in the graphics and text version on my 464 and I got killed quite often by the Nasties.

So I used RESTORE and the Lenslok, which was cursed a number of times until I got used to it. Anyway I found that if you enter the wrong code each of the three times when you are asked, then you're back in the game at the place where you were killed, with 200-odd stamina points, depending on how much the Nastie's last blow cost you. So, you can't lose.

This only fails when the last blow costs you one point of damage, in which case you have to use RESTORE again. This procedure also applies to the extended text version.

Finally, the text and graphic version doesn't respond to RESTART as is the prompt when you are killed, you have to use RESTORE or Quit.

A. Swinbourne,
Redditch,
Worcs.



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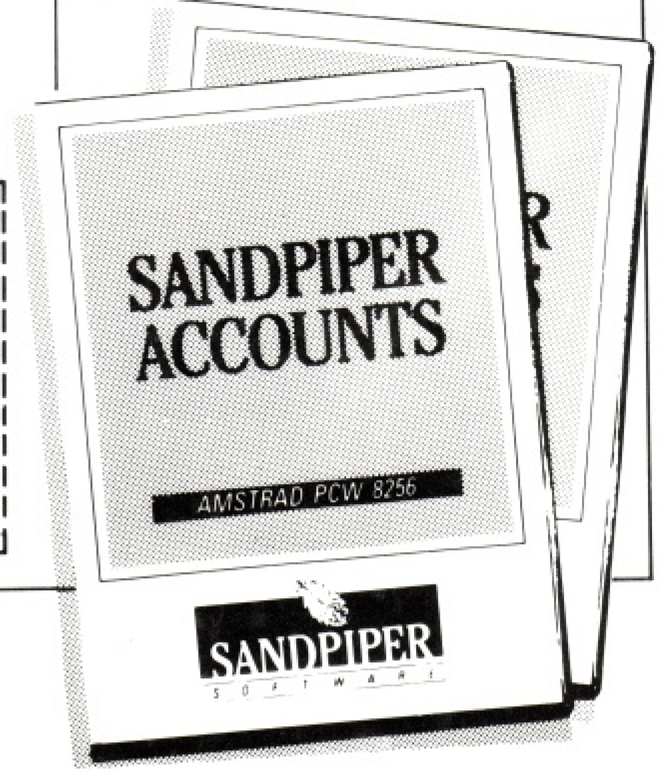
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SEEK AND YE SHALL FIND...

Into adventures with Bill Brock

A new name has crosssed the English Channel and is about to hit the British software market – Infogrames. Mandragore, its first release over here, has been very successful in France and there is nothing quite like it available for the Amstrad. It is a role playing fighting adventure for four characters, loosely based on Dungeons and Dragons.

In addition to giving the characters an opportunity to develop their experience and gain wealth, there is an underlying quest for the player to tackle and quite a few puzzles to solve.

Mandragore has a 37 page instruction booklet that includes a long background story to set the scene for the adventure. The ruler of Mandragore, the benevolent King Jorian, has been killed by a strange shower of shooting stars. On his death, control of the land has been taken over by the unknown and evil Yarod-Nor. The task of your team of adventurers must be to search out and find the means of Yarod-Nor's downfall.

The game is available for the CPC464, 664 and 6128, either on two cassettes or a double sided disc – and that makes it a pretty large game. A further formatted disc or blank tape is required if you wish to save your party's progress on their way to their ultimate goal.

Load the game and you will be given three choices – start with a blank team and form a party of your choice, continue with a previous adventure or use a ready formed party with Syrela, a female minstrel, as the leader.

Instant mix

It is probably wise for the first few forays into Mandragore to use the ready formed team. Death comes quickly to the uninitiated or careless, and Syrela's team will enable you to get some idea of what it's all about and also which characters are best at what. Hopefully you will learn how to cope with the initial difficulties after this experience and so be able to choose a party of your own.

When you decide to start a new adventure you first create the four characters who make up the team. For each member you must divide 80 points between six attributes, with a minimum of 5, and maximum of 20 for each. These are constitution, strength, knowledge or intelligence, wisdom, dexterity and appearance. The last of these seems a strange attribute to include but would seem better explained as charisma.

Each character has to have a name – up to six letters – and you may also choose their sex – only two choices here! Five different racial types are possible – Human, Dwarf, Hobbit, Elf or Mi-Orc (Mighty Orc?) but no information is given as to what difference this choice will make.

There are six character types – a warrior, ranger, wizard, cleric, thief and minstrel. To qualify for the last five you must have given 15 or more points to their main attribute – the ranger, strength, the wizard, knowledge, the cleric, wisdom, the thief, dexterity and the minstrel, appearance. Anyone may be a warrior, as no special qualifications are needed.

The final choice is the character's colour. This helps when they are all on screen and you have two or more team members of the same type. Press the Space bar to select different colour combinations. Having created a team save it to disc or tape as soon as you enter Mandragore. Creating a team is not a long process, but you will not want to go through it all again if someone dies in the first few minutes of play!

On the map

When you first start exploring you are in forested country to the west of a chateau (note the French connection) and north west of a village. In this map mode your team is shown by a single figure, around which the countryside scrolls as you key in directions – N, E, S, W).

Several different types of land features are shown – plains, forests, hills and swamps, all of which are passable. Inland seas may only be crossed by boat and ranges of mountains limit your movement at the borders and ensure that your path is never direct and straight for very long.

There are many villages to visit – press V to enter and M, for map, to leave. Here you can buy or steal a selection of useful items. The internal layout of all villages is the same and each provides a source of, among other things, weapons and food.

There are 10 chateaux (press C). Each is different and has at least one major puzzle to be solved that will help you on your quest. One houses the evil Yarod-Nor, whose defeat signals an end to your long journey.

When in villages or chateaux, the plan view of the map changes to a limited 3D picture displaying the location, the members of your team and any objects or creatures present.

On the right of map or picture is a list of your characters showing their experience and life force. Below is a list of visible objects or creatures. A maximum of four things can be seen at any location with each being coded A to D.

Shift and the numeric keys 1 to 4 will display a full status report on each of your characters. This includes

any objects, food or money they hold. Each may only carry four items and these will be given a number, 1, 2, 3 or 4. Note which number refers to what, as Mandragore has an input routine that accepts highly abbreviated commands.

Each of the four team members has a number and the 29 acceptable verbs are recognised by either one or two letter abbreviations. This is a little confusing at first but once mastered, enables commands to be issued very quickly. 1 BU B will display on the screen as "Syrela Buys Sword," the sword being the object B at that location.

Some verbs support two objects, for instance 4 AT A 2 converts to "Torlin Attacks Berserker With Sword" – this is why you must remember that in Torlin's inventory, item 2 is a sword.

As you move around in map mode, a variety of wandering monsters will appear. You may attack them or run away, but if you run away each character will lose 10 of its 50 life points. Defeat a monster and its killer will gain experience points. Experience is also gained for most successfully completed actions – disarming booby traps, finding treasures, opening gates and so on.

Damage to a team member, either from a monster or a booby trap, will cause a loss of life force – no life force and that person is finished. Fortunately, each village has supplies of food which can increase it.

However this has to be bought, which uses a strange command – Syrela Barters 50 – getting her 50 units of food at a cost of 50 units of money. In several locations within the chateaux you can find animals to hunt. These may be eaten and also increase life force.

Except for the food, once something has been bought from a shop in a village it cannot be bought again without leaving the village, entering a chateau, and returning to that village.

Illegal gain

With an experienced thief you can raise your party's funds to almost any level – visit villages, steal things and GIVE them to another member of the party to SELL. These actions are vital, because if the thief is caught, all objects, money, food and some life points are taken from the thief as a punishment.

In this adventure no synonyms are accepted – you must use the right word – but having said that, a full list of verbs is provided in the instructions. You can TAKE many of the things you find but you cannot drop them to retrieve later – they are gone for good. The word drop is not understood as DR is used for DRINK, so you must use the unusual word LAY instead.

Characters may talk to many of the creatures they meet by using the form: Syrela Asks Princess. This may result in a brief and cryptic clue about puzzles to come. Other commands include OPEN, BREAK, SHOOT, READ, but not all are successful at the first try, so if in doubt – try again. Sometimes a different character will have more success. The Copy key repeats the last command and is a very useful facility.

You may split your team up and control them independently. They could each explore a different chateau or different rooms in the same chateau. This did not appear to be a great deal of use, as often the team's attributes complement one another. Perhaps it could well be used for a multiplayer game.

Special commands are available to wizards – including LOOK, TELEPORT, HYPNOTIZE, SPELL, PARALYSE and PETRIFY. The last three came in handy occasionally as a variation to drawn out hand-to-hand battles. I'm still looking for a good use of the hypnotism spell.

The pictures are chunky block graphics, which are drawn quickly and set the scene well enough. The puzzles are not that easy, so don't expect to solve this game quickly. A boat must be bought at some stage, as not all the chateaux are on land. To explore thoroughly you will have to defeat the monsters blocking your way in the chateaux. Each 1000 experience points raises a character's level, the higher the Level, the easier are your battles.

This is an interesting game with more to it than first meets the eye – a good challenge although the basic plot and the linking of the various puzzles could be better. A series of superb American games of a similar nature for the Commodore 64 started quite a cult following. Perhaps Mandragore is the first of a series that will prove as popular.



Brainteaser or brainstorm?

Have you ever fancied your chances as a private eye? Well, now is your chance to see if you have what it takes. Old Scores has been some time coming but would appear to have been worth waiting for. Released by Global Software it will be available for all Amstrads including the PCW 8256.

It is an involved adventure, taking place mainly in the South Bank complex which houses much of London's culture – the Royal Festival Hall, National Theatre, Queen Elizabeth Hall and National Film Theatre.

You play the part of a slightly down at heel detective. You and your boss have just spent an enjoyable few hours in a pub just across the river from the South Bank. All good things come to an end though, and you have both been ejected quite forcibly by an irate bartender.

An old adversary of yours is a criminal nicknamed The Collector and a clue leads you to suspect that he will be operating that night on the South Bank. There is to be a special performance of one of Mozart's works where the conductor will use the original manuscript – this old score would be a prime target for The Collector.

Things hot up as you discover dead bodies and learn of other works of art that have also gone missing. Your task is no easy one as this adventure is very real to life on several counts. Firstly it faithfully follows the complex layout of the South Bank, making it no easy matter to map. Then, it requires you to dabble in a little thievery yourself all in a good cause of course! Get caught and you pay the penalty. Finally, time is of the essence, various events will happen regardless of what you do, so you must be in the right place at the right time.

Realising that the game has a great many locations distributed in a fairly complex manner, Global will supply any lost adventurers with a partial map. This will show all the locations that can be visited without solving any of the game's puzzles and represents about 75 per cent of the total. If you do require this helpful service remember to include a stamped addressed envelope with your request.

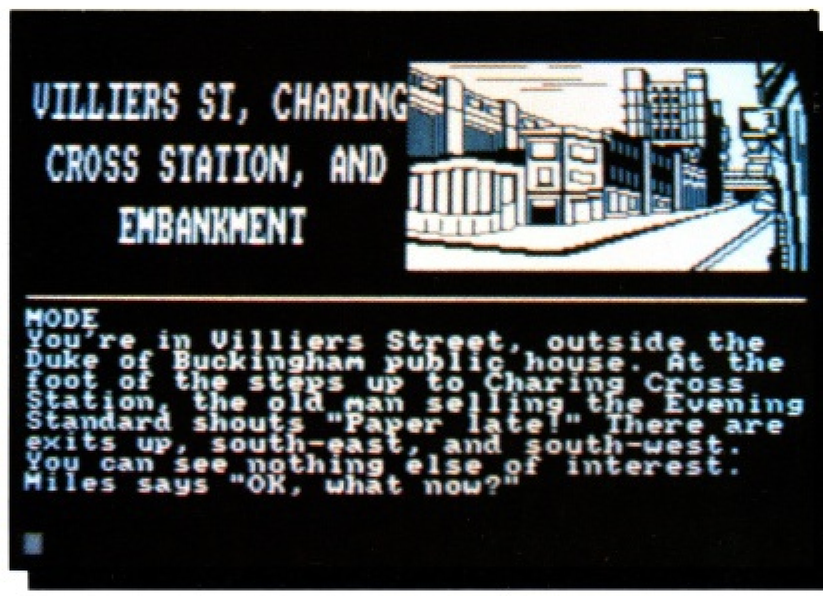
The game utilises a sensible form of real time, each move you make will move the clock on by a fixed amount. Unlike some games, there is no "time passes" message appearing on the screen to disturb your concentration on what to do next. As both of our 'eyes have pawned their watches, telling the time can be fun in itself – in some locations you can read a clock but in others...

This is quite a remarkable game written by a very devious person who has continually asked himself "Is this what could really happen?" Vital objects often only become obvious once their importance has been realised, steal something near the beginning of the game and you have 15 seconds to get away – or the police get you. There are several complex puzzles to solve, but they are all disgustingly logical – frustrating but always logical.

You may save the game at any time as a numbered file or make use of the very rapid QS (quicksave) facility. You'll use both options many times before you manage to get to a complete solution to this one. If you QUIT you will find that you are given a hint as to how much is involved.

Several dead bodies have to be found, you must find the missing art treasures and gain evidence against The Collector. Finally you must work out a way to trap this evil mastermind into revealing himself.





Be prepared for long sessions at the keyboard. Each puzzle solved will give you a tremendous sense of achievement, but have another adventure on hand to play when the strain gets too much. Just remember that logic and science triumph with a little help from Lady Luck.

Watch what you spend your money on, be mean unless you feel you must buy something, and have a pencil and paper handy to make the odd note or two. If you uncover incriminating evidence, do not leave it in plain sight for all to see – it may spoil your future plans.

The parser will understand complex inputs and is very effective. Inputs such as "Drop All Except The Jacket" can certainly make life that much easier. There are occasions when more synonyms may have been included, but you will rarely have to repeat a command using different words more than twice. I also like the way your companion, Miles Archer, automatically adds useful items to your inventory.

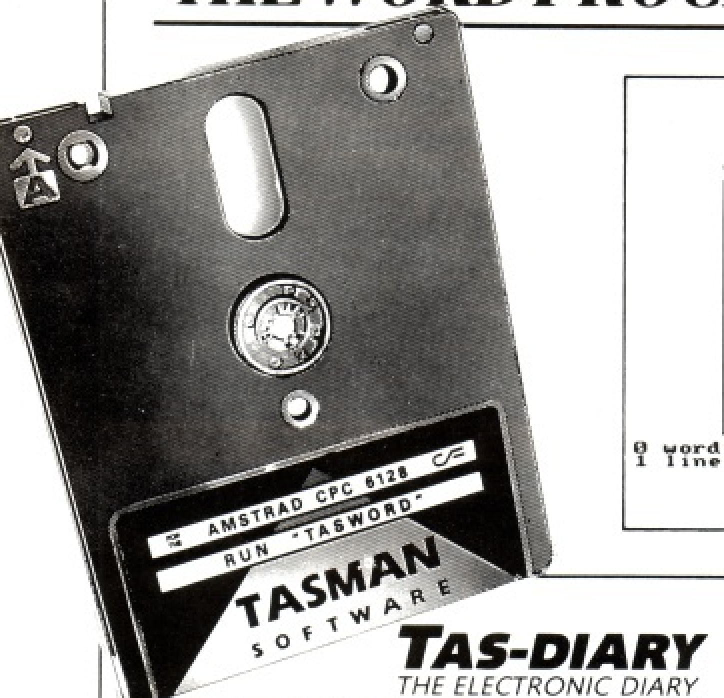
You may speak to several characters you meet in your travels – heed well their words. Some may need a little encouragement (not force!) to give you the clues you are after. Misdirection is the thing in this game, to foil Mister Bad and also for you to manoeuvre the objects you want into the right places at the right times.

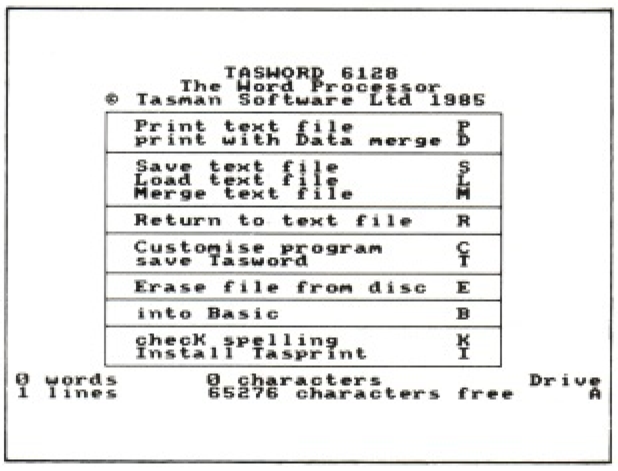
Old Scores is a refeshingly different adventure, worth checking out.

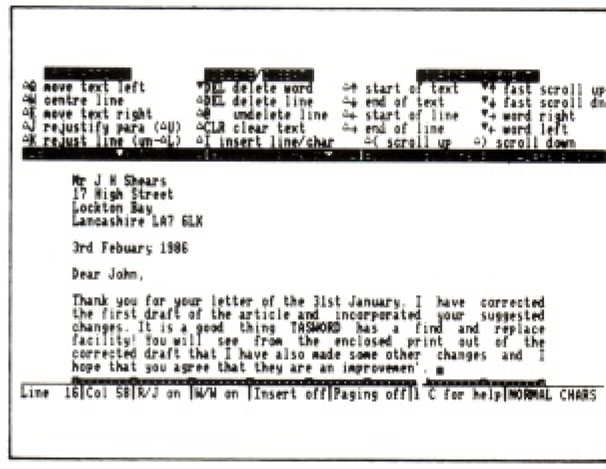
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TASWORD 6128

THE WORD PROCESSOR FOR THE AMSTRAD CPC 6128







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THE WORD PROCESSOR

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Brilliant value for money.
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A powerful and easy to use word processor and a superb data merge program.
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TASWORD 6128 is the word processor especially developed to utilise the extra memory in the CPC 6128.

The program uses ALL the additional 64K of memory in the CPC 6128 as text space. This means that text files can be around ten thousand words long.

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This is the new TASWORD especially developed to utilise the capabilities of the CPC 464 and 664 disc drives. The additional facilities include a larger text file size and automatic on-screen disc directories during save and load operations. A major new feature is the mail merge facility. This gives multiple prints of your standard letters, forms, etc., with each copy containing, for example, a name and address automatically taken from a disc file containing the data. This data can be entered using TASWORD 464-D, or created using the Masterfile Program Extension package. A powerful and useful conditional printing facility is included – parts of a document can be printed according to user-specified criteria. TASWORD 464-D will only run on, and is only supplied on, disc.

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Please note that TAS-SPELL will only work with TASWORD 464-D and TASWORD 6128.

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THE WORD PROCESSOR

TASWORD 464 cassette £19.95

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POPULAR COMPUTING WEEKLY, NOVEMBER 1984

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THE SCREEN COPIER

TASCOPY 464 cassette £9.90 disc £12.90

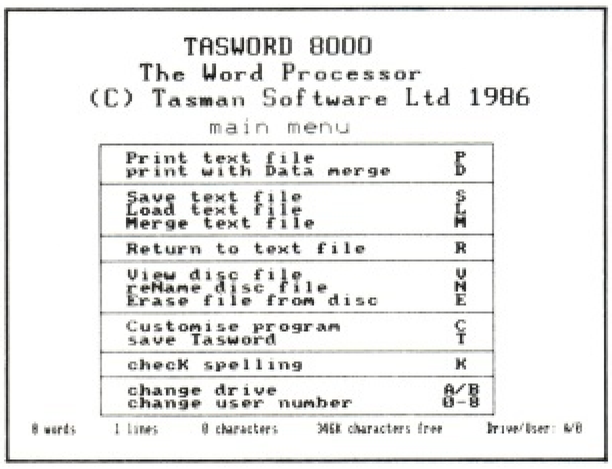
A suite of fast machine code screen copy software for the CPC 464, 664 and 6128. Print high-resolution screen copies in black and white and also large 'shaded' copies with different dot densities for the various screen colours. TASCOPY 464 also produces 'poster size' screen copies printed onto two or four sheets which can be cut and joined to make the poster.

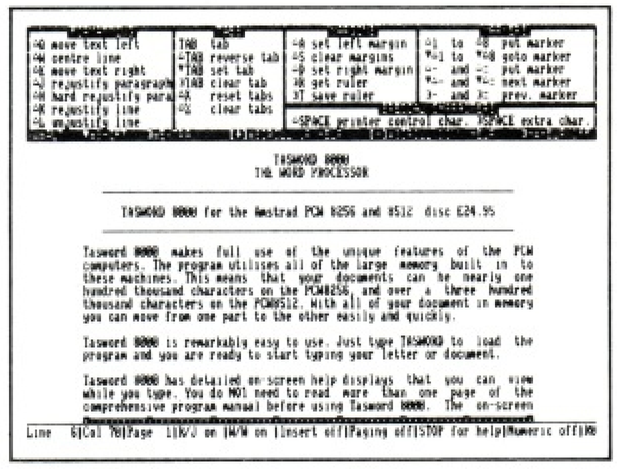
TASPRINT 464 and TASCOPY 464 drive the following dot-matrix printers:

AMSTRAD DMP1	MANNESMANN	STAR DMP501/5/515	SHINWA CP-80
EPSON FX-80	TALLY MT-80	BROTHER HR5	COSMOS-80
EPSON RX-80	BROTHER M1009	DATAC PANTHER	AMSTRAD DMP2000
EPSON MX-80 TYPE III	NEC PC-8023B-N	DATAC PANTHER II	

TASWORD 8000

THE WORD PROCESSOR FOR THE AMSTRAD PCW 8256 AND 8512





TASWORD 8000
THE WORD PROCESSOR

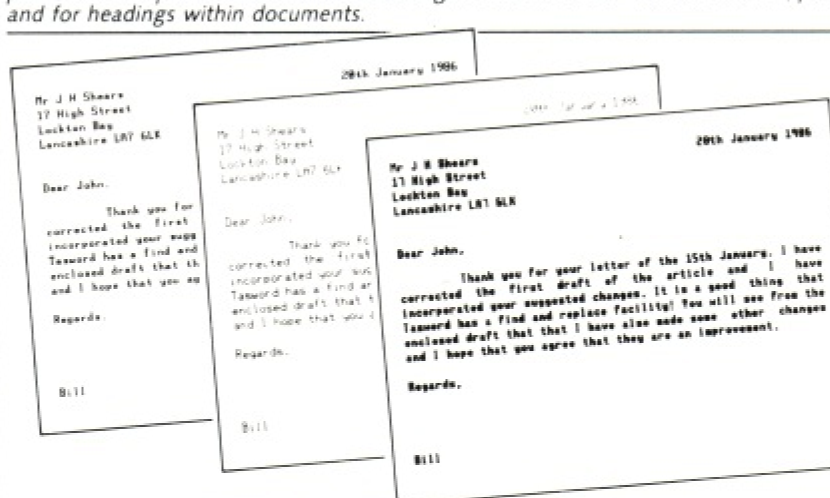
TASWORD 8000 for the Amstrad PCW 8256 and 8512 disc £24.95

TASWORD 8000 offers a fast and flexible approach to word processing on the PCW 8256 and 8512.
TASWORD 8000 has been especially developed to make use of the unique features of the PCW computers, utilising ALL of the large memory built into these machines. Your document can be nearly onehundred thousand characters long on the PCW 8256 and over 300,000 characters long on the PCW 8512. That's enough room for over 100 pages!
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TASWORD 8000 is remarkably easy to use. You can view detailed help displays AT THE SAME TIME as you are typing. The detailed manual and the interactive TASWORD 8000 TUTOR supplied with the program mean you can be producing quality documents immediately – you only need to read one page of the comprehensive program manual before using TASWORD 8000!
TASWORD 8000 includes a sophisticated set of print options which allow you to print any part of your document, automatically number pages and print headers and footers. Printing multiple copies of a document is easy – just enter the number of copies required. TASWORD 8000 can be used to take full advantage of ANY printer connected to the PCW via the Amstrad parallel/serial interface.
DATA MERGE. TASWORD 8000 includes the powerful Tasword mail merge facility. You can store a list of names and addresses on disc and Tasword will print your letter, each individually addressed, to each of your intended recipients. The TASWORD mail merge is open-ended and flexible – storing names and addresses is just one application. Printing can be made conditional: just send a letter to addresses in London, for example.
TASWORD 8000 includes two of the unique TASPRINT 8000 fonts (Lectura Light and Median). This gives you two new unique typestyles on the PCW printer. The TASPRINT fonts give your printed documents a very special appearance and have great impact when used for headings within your text.
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TASPRINT 8000
THE STYLE WRITER

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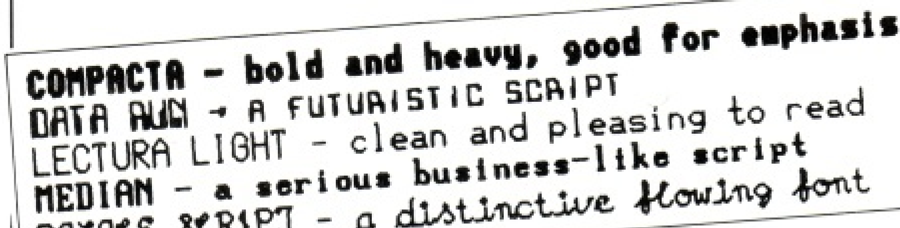
TASPRINT 8000 consists of a further six fonts that can be used with TASWORD 8000 to extend and enhance the variety and appearance of your printed documents. In addition, with TASPRINT 8000 you can print files from disc onto the PCW printer in one of the eight TASPRINT 8000 fonts. TASPRINT 8000 utilises the graphics printing capability of the PCW printer and the printed text is double the height of normal text – ideal for notices, posters, and for headings within documents.



TAS-SPELL 8000
THE SPELLING CHECKER

TAS-SPELL 8000 for the Amstrad PCW 8256 and 8512 disc £16.50

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HAIRY HACKERS HAUNT



Get some joy from that little black box

Vax continues in his efforts to destroy more joysticks and offers some jolly useful pokes.

Ho hum, time for a mini-reviewette of the Britannia auto-fire thingummy, as tested on Marcus and Kim, two deceptively small and destructive kids. If they can't break it, I have high hopes of its durability. "It" is a little black box that plugs into a joystick port at one end, and – surprise, surprise – a joystick at the other. Contained within are a CD4016 leggy thing, a couple of capacitors and a resistor. You also need a little 9v battery, which you are obliged to fork out for separately.

Don't worry about the lack of an on/off switch – this is one of those strange devices that lets the battery die of natural causes before it runs down.

So, there you are with your black box and stick, and any game you played that used to have a single-shot peashooter now has an excruciatingly devastating fully-automatic laser cannon. Brilliant for defend or die, only one snag – the gizmo doesn't work with Amstrad joysticks. All others are fine, but Hamsterd ones – nah!

Here's why and how (hope you're all taking notes, class). To prevent two joysticks interacting with one another Amstrad chose to put diodes in its joysticks. Diodes, in case you're one of those people who thinks that they're a poem to a certain princess, are little glass tubes that only let the volts go one way. They sucessfully block all attempts by Brittania to do an auto-fire. Now the way round it is to short out the diode. Simple, innit ? It may be simple, but for chrissake, read through the details first.

The one that you want can be determined from the diagrams helpfully labelled JY-1 and JY-2. Dismember the base of your joystick, find the diode and wrap fuse wire about it in such a fashion as to link the little wires on it together. Lucky people with soldering irons can just solder a wire across the diode.

Unlucky people may discover that their joystick's innards look completely different from the ones that I picked apart. Oh dear. Unless you are into tracing circuits, it might be just as well to forget the exercise.

Assuming that you're one of the lucky ones, slam it all back together again and it will now work (Ha ha. Pull the other one, it squirts custard). Not that difficult after all,was it? Remember that doing this makes your guarantee as worthless as a pair of fetid dingo's kidneys, and don't blame us if you manage to totally wreck your joystick.

Also remember that any two-joystick game will cause your opponent's 'stick to behave in a very strange manner when you push the fire button down.

There were plans at one time to publish a mod for the JY-2 that interrupted the common-2 line when you pressed the second fire button. Practical upshot is: You hit the button, player 2 loses control. Sneaky eh?

A few passing thoughts. The little

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We have lots of other language and utility products for the Amstrad range of computers from the CPC464 to the PC1512!

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HiSoft TurboBASIC

At long last there is a fast and powerful BASIC compiler for Amstrad BASIC! HiSoft TurboBASIC is a true compiler of Locomotive BASIC 1.0 on the Amstrad CPC series of computers turning your BASIC statements into machine code programs to be executed whenever you like.

TurboBASIC certainly is fast, just look at the PCW benchmark timings using interpreted BASIC and compiled TurboBASIC:

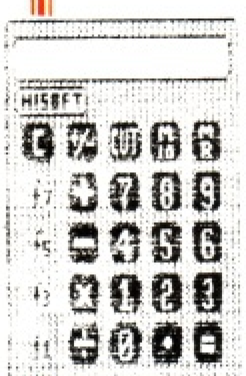
	BM1	BM2	BM3	BM4	BM5	BM6	BM7
Interpreted	0.116	3.31	9.17	9.62	10.18	19.1	28.9
Compiled	0.0042	0.046	1.13	1.12	1.12	1.39	1.55
Speed up	27	71	8.1	8.6	9.0	13.7	18.6

All timings in seconds

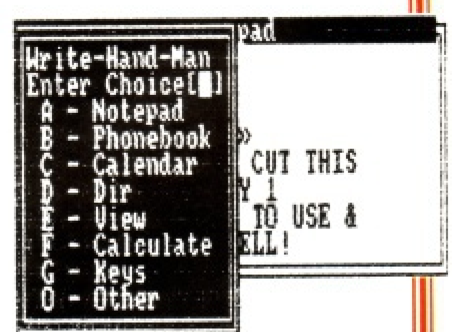
Also, the BYTE Sieve benchmark, which is an example of a whole program and not a somewhat artificial benchmark, executes in 2.56 seconds when compiled with TurboBASIC as compared with 122 seconds when interpreted with BASIC 1.0, a speed increase of 49!

TurboBASIC is an *integer-only* compiler which means that it only compiles whole-number arithmetic, not floating-point. This allows compiled programs to run with extra speed and, in conjunction with the Amstrad graphics (all of which are supported by TurboBASIC) some pretty amazing games can be written in BASIC instead of machine code. We supply an example space invaders game free with TurboBASIC so you can see for yourself the dramatic speed increase.

HiSoft TurboBASIC £14.95 tape, £19.95 disc



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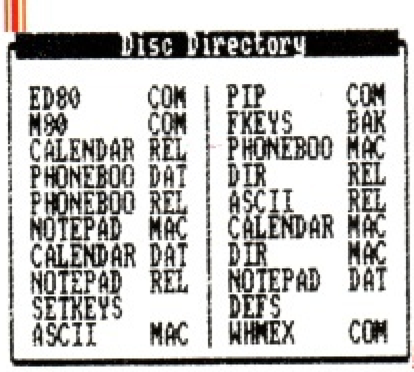
We have now produced a brand-new version of Write Hand Man with many improvements and extra features some of which are:

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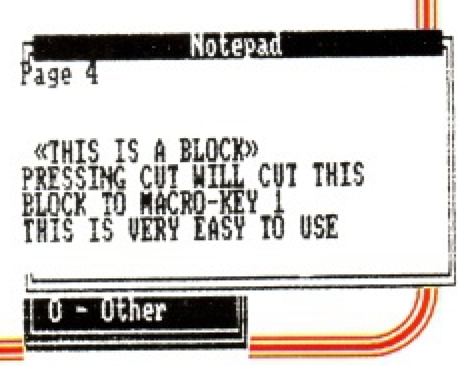
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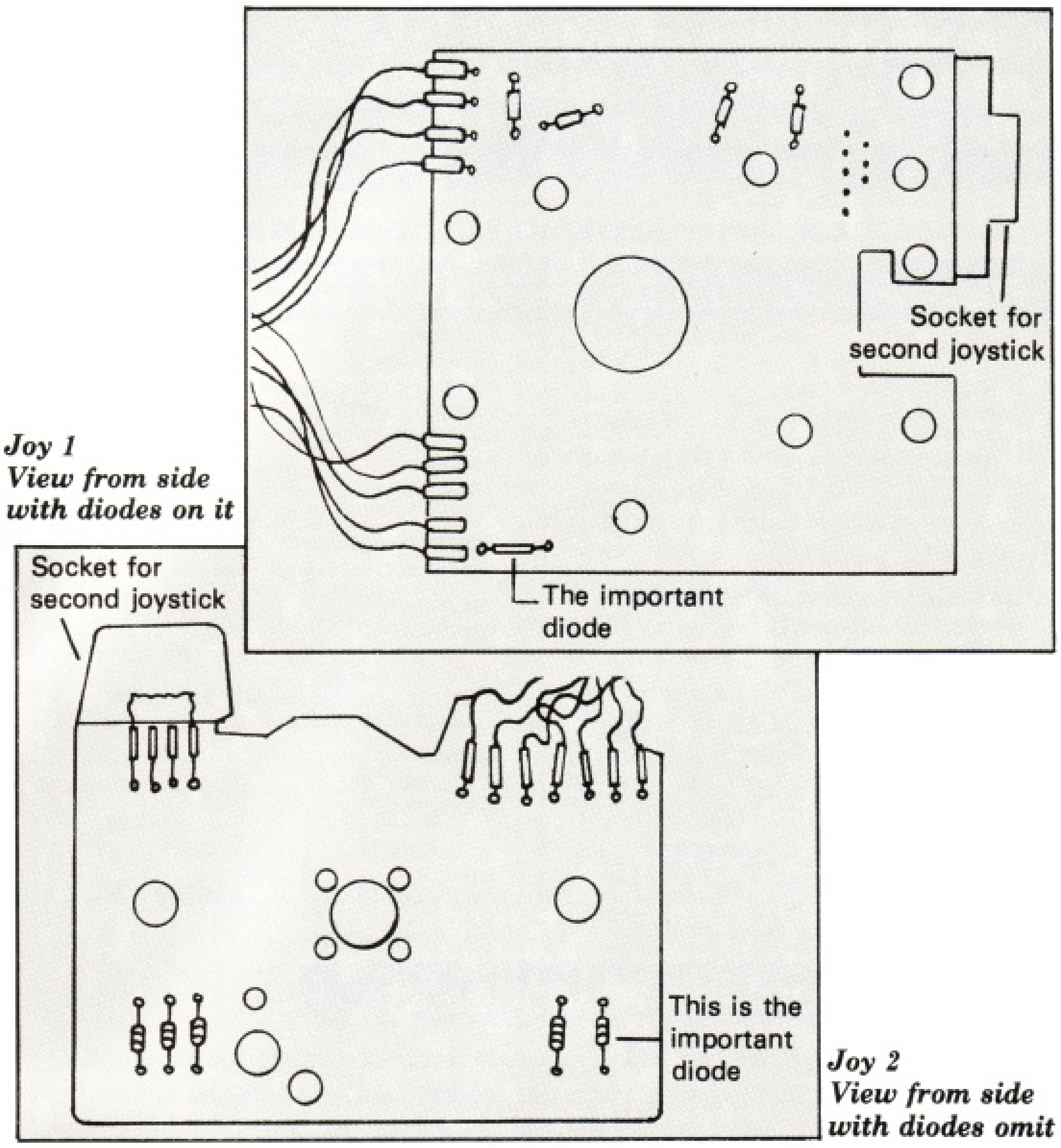
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Joy 1
View from side with diodes on it

Joy 2
View from side with diodes omit

boxette just happens to add that extra foot 'n' a bit to your cable that lets you sit on the sofa without pulling the 464 off the table, and don't try using this for Moon Cresta – you can't dock.

On with the Pokes

That master of the monitor Justin Garvanovic has produced some more pokes to be proud of. First off Infinite lives for Cauldron II. Rewind the tape and run the routine below. More power to your pumpkin.

```
10 MODE 1
20 tot=0
30 FOR n=&BE00 TO BE21
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>3751 THEN PRINT "Error in dat
   a":END
80 DATA 21,0e,be,3e,c3,32,94,00
90 DATA 22,95,00,c3,40,00,21,00
100 DATA 00,22,f2,c1,22,f4,c1,f3
110 DATA d9,01,8e,7f,ed,49,d9,c3
```

If your Molecule man has lost his bearings then perhaps you could do with Justin's infinite time and radiation pills routine. rewind the tape and run the routine below.

```
10 INK 0,0:INK 1,26:MODE 0:LOCATE 5,10
20 PRINT "Molecule man":LOCATE 6,12:PRIN
   T "is Loading"
30 MEMORY 4999:LOAD "!m1":LOAD "!m2":MOD
   E 1
40 PRINT "Nearly there now. Phew."
50 POKE &6A44,0: POKE &6A45,0:POKE &6A46
   ,0
60 CALL 2700
```

Justin's final contribution this month is a hand for Storm players. This routine provides infinite energy for both players. Also included is a routine to change the playing keys. As it stands it will re-configure Agravain to joystick and the Copy key. The new controls are:

Agravain	
Joystick up	Forward
Joystick down	Use scroll
Joystick left	Turn left
Joystick right	Turn right
Joystick fire	Fire
Keyboard copy	Use mask
Storm	
Keyboard Q	Turn left
Keyboard W	Turn right
Keyboard /	Forward
Keyboard Space	Fire
Keyboard /	Fire Amulet

Alternatively the last line can be altered so that any key combination can be used. Here is the new datum line so that two joysticks can be used.

```
DATA 9,76,72,74,75,73,52,48,50,51,49
```

This can easily be altered to any setup by using the diagram in the 464 or 6128 manual, found at appendix III page 16 (464) or chapter 7, page 23 (6128)

The order of numbers is:

Agravain	
First number	Use mask
Second number	Fire
Third number	Forward
Fourth number	Left
Fifth number	Right
Sixth number	Use Scroll
Storm	
Seventh number	Fire
Eight number	Forward
Ninth number	Left
Tenth number	Right
Eleventh number	Fire Amulet

If you want to leave the keys as they are then do not type in lines 150, 160, 170, 180, 190, 200, 210, 220, 230, 240 and 250. The routine is type it in, rewind the tape to the start and run it.

```
10 MODE 1:MEMORY &3000
20 PRINT "Please wait."
30 LOAD "!des",&35C0
40 LOAD "!",&7D74
50 LOAD "!",&5500
60 CLS
70 PRINT"Don't worry about the mess."
80 LOAD "!",&C170
90 FOR n=&BE00 TO &BE0D
100 READ a$:POKE n,VAL("&"+a$)
110 NEXT n
120 READ a:IF a=0 THEN 145
130 POKE a,0:POKE a+1,0
140 GOTO 120
145 READ a,b,c,d,e,f,g,h,i,j,k
150 POKE &CFFE,a
160 POKE &D002,b
170 POKE &D006,c
180 POKE &D00A,e
190 POKE &D00E,f
200 POKE &D012,g
210 POKE &D057,h
230 POKE &D05B,h
240 POKE &D063,i
250 POKE &D067,k
260 CALL &BE00
270 DATA 21,70,c1,11,70,1,1,0,34,ed,b0,c
    3,70,1
280 DATA 54438,54475,49724,49708,55347,5
    5339,55376,0
290 DATA 9,76,72,74,75,73,47,30,67,59,22
```

My good friend Stewart Russell has written in again with Grovel Lock engaged on his typewriter (well, don't look so surprised, some people do write in you know). This time the offering is 255 lives on Chuckie Egg 2. The original is a weensy bit tricky, and with as many lives

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as that the age of exploration dawns once more.

A kind man, he deserves the copy of Elite by those awfuly nice Fírebird people, now winging it's way to him by Royal Snail as a bribe-ette for his efforts.

Here's the bit you type in. Save it, run it, and follow distructions on the screen. Easy as 3.141592654 :

```
10 MEMORY 41999:MODE 1:chex=0
20 FOR s=42000 TO 42027
30 READ a$
40 POKE s,VAL("&"+a$)
50 chex=chex+PEEK(s)
60 NEXT s
70 IF chex<>3380 THEN ? CHR$(7);"Data Er
   ror":STOP
80 CALL 42000
90 DATA 06,00,11,22,9B,CD,77,BC,21,00,01
   ,CD,83,BC,E5,CD,7A,BC,3E,FF,32,C2,67,
   E1,E9,53,43,52
```

I've also found another old one of his under my fan mail (More – More – My ego is withering) for the "They sold a $10E^6$" version of Sabre Wulf. Well, at long last, yur 'tiz:

```
10 REM Infinite lives for Sabre-Wulf by
   S. C. Russell 1986
15 MODE 1:BORDER 0:INK 0,0:INK 1,9:INK 2
   ,24:INK 3,6
20 MEMORY 4863:LOAD"!SABPIC",4864:CALL 4
   864:LOAD"!",4864
30 FOR S=0 TO 3:INK S,0:NEXT:LOAD"!",&C0
   00:POKE &DD60,0:CALL &C000
```

You may want to put POKE &D3C3, lives in place of the POKE statement in line 30. Try to keep it lower than 37, 'cos the program won't let you finish if you've got too much life in you. Unfortunately, I haven't found a copy of Sabre-Wulf, so we'll just have to take Mr. Russells' word for it.

PCW Pokes

Supernova Software managed to squeeze in front of Batman on the PCW8256 with its Supernova Space Invaders – what a novel theme! Not to be outdone, here are the first games pokes for the Joyce. It's all a bit complex, but worth it.

First off, make a backup of the game. The procedure below will not muck up your game, but you might. Next, you have to alter the game with the dreaded SID (Symbolic Interactive Debugger), and also much feared in the Amstrad purchasing dept (a little in joke there to keep them happy).

With your machine freshly booted into CP/M, owners of machines with two disc drives put their copy in drive A, Programming Utilities in B. Owners of one drive machines put Programming Utilities in A and type in "SID B:INVADERS.COM" and Return. When it squeaks at you, exchange the system disc for your copy of Invaders, then owners of both computers type in the following (computer's contribution in bold).

CP/M 3 SID – Version 3.0
NEXT MSZE PC END
1F80 1F80 0100 DAFF
#swee7
0EE7 FD83 0 These bits stop the noise
0EE9 043E .
#sw1104
1104 F8D3 0
1106 E701 .
#sdcb
ODCB 3D 0 These bits give infinite lives
ODCC 32 .
#s1348
1348 3D 0
1349 32 .
#wFRED.COM This makes a POKED version called FRED
003Dh record(s) written.
#[STOP] and this gets you back to CP/M neatly.

Thanks to Cliff Lawson for sorting out the intricacies of SID, and showing the world how to fly it.

Ah! The miracles of modern technology. And that's all there is to it. And this makes two sentences in a row starting with "and". And now I will cut it out.

Your invaders will now be totally silent, completely indestructable, and thence more playable at office parties, but if you feel like being a noisy but indestructable miscreant, just leave out the relevant lines.

The challenge

OK. Angry hat on here. Some newly-born, wet-behind-the-ears magazine claims to have a hairier hacker than me. I may not be the only Hairy Hacker – greetings to Dave Nicholls – but I do take pride in my hair, and hereby challenge this fellow to a body-hair contest. He may have a beard, but I've got hairier armpits. I throw down ze gauntlet.

Do people remember Roland in Time, or Roland in Space, by Gem Software ? Am I betraying my age ? Am I just waffling to fill up this column? No. The point I wish to get over is that I have one of these eight-key-left-handed-alternate-fingers - crossover - on - odd - Thursday pokes.

Both the last games give an infinite life when you hold down Ctrl, Shift, TabGEM and – I think – jump at the same time. Shame that you can't get the last Jewel in Roland in Time innit ?

Another Gem game that you can now cheat on is Doors of Doom Plus – game that was well killed-off by Amsoft. A good theme was trying to acquire really good, hot, strong cups of tea while saving the universe. Ctrl Shift X moves you to the next planet, with a full load of energy.

Anybody know of more like it ? You do? Wonderful! Pack them off to the Hacker's Hovel, c/o ACU blah, blah, blah, blah, Brentwood, blah, blah.

How the tape works

I had a letter from Ima Pseudonym – I believe you, millions wouldn't. He asked a few intelligent questions which the rest of you might want to hear about. The first one was: "How do you get into a protected Basic loader without a deprotection program ?". The answer is, you can't. We naughty hackers either use a deprotection program – I got my first one off a bulletin board – or, reckon that we know full well what's going on and don't bother with it.

He then goes on to ask a lot of questions about ROM calls on his 6128. First off, the new firmware manual should be out by the time you read this, shifted by Amsoft somewhere in deepest Sunderland.

Secondly, he asks about loading in code and headers. The easiest way of loading and saving blocks of code is with the LOAD and SAVE commands from Basic, which work on binary code as well (R.T.F.M.*). The header tends to live a little bit above HIMEM (on or about &A70A on disc systems after an OPENIN, but don't quote me on that), and has the following structure:

Bytes:	0-15	16	17	18	19-20	21-2	23
	Name	Blck	NoLast	Type	Length	Loc.	First.

Other bytes of interest are 24 and 25, which hold the total length of the file, 26 and 27, which hold the entry point of the program, and 28 to 63, which seem to be fair game for anything.

Of the type byte, bit 0 is the protection bit. To break protection read in file, zero this bit in the header, and write it out again. Un morceau de gateaux, as they say in France.

The next three bits in the byte describe whether the file is Basic, binary, a screen image, Ascii (askee sillee question), or something else. Finally, the last four bits in the byte should be set to 0001 for Ascii file, and 0000 for all else. There, writing of deprotector is left as an exercise to the student.

Last off, he asks about assemblers and dissassemblers/monitors. Well, in last month's issue there were a lot of comparisons and opinions passed about. There were no clear favourites, but mine are the Hisoft and Arnor offerings. I used to use Mona by Hisoft for producing real disassemblies, until I wrote my little patch – see last month. I still do use it from time to time as a straight monitor, as the single step tells you everything.

While doing most stuff though, I tend to use Maxam by Arnor. Basically because it lives in a ROM, so I can't overwrite it, and I don't have to reload it when everything falls in a very big heap. Why did Devpac in ROM never take off?

(Read The Firmware Manual).*

ACU

AMDRUM

With a little bit of help your micro can sound like Phil Collins – all you need is Amdrum and some amplification. Rupert Goodwins sounds it out.



Once upon a time a caveman picked up a stick and bashed a hollow log. Meeting with grunts of approval from his fellow Cro-magnons, he proceeded to experiment with bits of stone, gourd and animal skins. Ever since that day the dru-ma, as he became known, has remained in an evolutionary backwater of his own, retaining the unique habits and appearance of prehistoric man.

Then, not so long ago, a company called Cheetah produced a nice, clean, civilised version of our tribesman in silicon, and since it plugged into a Spectrum called it the Specdrum.

It sold awfully well, and now it has started on the evolutionary path by adapting itself in true Darwinian fashion to the new ecological niche of the Amstrad. It's changed its name in the process, too.

The Amdrum, as regular readers will know, is a drum synthesiser which plugs into a CPC and an amplifier. Upon loading the software with which it is endowed it can produce a number of drum sounds and string them together to form complete tracks.

Thanks to a technique called sampling, the sounds are quite remarkably realistic.

Sampling is quite a complex process, but basically works by turning a sound into an electrical signal, measuring the size of the signal and recording the results as a digital value. The process is called, not unnaturally, digitisation. The resultant value is stored in a computer's memory, and can be turned back into an electrical signal, and thence into a sound, by the computer.

The main problems with this system is that sounds can change very rapidly – up to 20,000 times a second or more – and have to be measured quite precisely to boot.

These are the reasons that sampling synthesisers have traditionally cost lotsa dosh, and been limited to such worthies as Kate Bush. Time marches on in the world of microchips and the same cost reductions that let you buy your Arnold (CPC 464, 664 or 6128) can be applied to noise makers.

The Amdrum goes further in cost cutting as most of the circuitry needed is already in the computer. The digitisation process can be done "once only" by Cheetah, who then distribute the "sound" as computer data on tape.

The computer can shovel the information out fast enough and can cope with the precision needed to emulate a drum sound without much trouble.

All the Amdrum has to do is take that data and turn it back into an electrical signal. You amplify this signal and Keith Moon can grace your living room, ceiling

---

SMART

Look Ma – no add-ons. You can get your computer to talk to you for a mere £9.95 thanks to some clever coding from Superior Software. Bill Hedley listens to the disc which answers back.

Hands up all those who've heard of Archie Andrews? No? OK then, try Basil Brush, Lord Charles, Joe 90 and Orville. Right! All dummies, and not a politician among the lot of them. And what's more, they could all speak the Queen's English.

Now this august bunch have been joined by Arnold (CPC 464/664/6128), working without any artificial aids whatsoever. You don't even have to stick your mitt anywhere socially unacceptable to get results.

Superior Software has produced Speech!, a package which imparts the gift of the gab to CPCs everywhere, with no extra hardware and a mere 8k's worth of RAM. No need for this "H4AY-LOO2U" business to seduce speech out of an unfriendly interface either – there's a very acceptable text-to-speech convertor plumbed in.

It must be said that the quality of vocalisation is not high, even Derek Jameson need not fear for 'is job, but the speech is understandable. Put it through an amplifier and it gets surprisingly good – there's not much between it and the hardware species of synthesiser.

To use it, run the installation program by RUN "SPEECH. This produces six RSXs which work as follows:

|SAY,"Hello	which says hello
|SPEAK, "H4EHLOW	which says hello using phonemes
|PITCH,4	Set the overall pitch of the output
|CENTRE |RIGHT |LEFT	Move the output to the appropriate channel(s)

The text-to-speech convertor, which is invoked by using |SAY, works on a dictionary basis for both letters and some punctuation, including full stop to lower the pitch at the end of a string, question mark to raise it and a comma to induce a pause.

It matches as much of the current string as it can against a phrase in the dictionary, and then repeats the exercise from the first unmatched point.

When it has disposed of the string in this way the list of sounds so produced is passed to the pronuciator section of the program, and out it all comes. The dictionary itself is quite comprehensive and is stored in a highly compacted form in order to save space, which is all quite standard for this type of utility.

Where this package scores is in the inclusion of an editor for the dictionary, albeit written in Basic and with a fairly nasty command syntax. Of course, to set up a dictionary entry you do need to know you phonemes – the "WEH4LKAHM" business mentioned earlier.

Phonemes are the elements of speech, from which any word can be constructed. This package has 49, from which the vast majority of English words can be composed. Other languages have different sets of phonemes, so Icelandic users should look elsewhere. Latin language users, Italians, French and the like shouldn't have too many problems – at least with this package.

– and probably next door too.

The Amdrum performs very well indeed as far as the hardware goes. The sound quality is as good as your average drum machine, and easily snappy enough to be used as such. Eight drum sounds can be produced, and a full set, or kit, come with the program – bass drum, snare, two tom toms, a cow bell, a couple of cymbals and the ubiquitous handclap.

They are divided into three channels and no two sounds in the same channel can be played at once. This is not as much of a limitation as it may seem, since the channels are carefully chosen and the unit can play two sounds on the same channel fast enough to make them seem simultaneous.

Two other kits were available at the time of writing – the Latin kit which has useful sounds with exotic names, and the Electro kit, which is a must. This, with a little bit of imaginative sequencing, can hip hop wid' de best of 'em. Half an hour with it, and Herbie Hancock watch out!

If you own a multitrack tape recorder the Amdrum can record – "put down" in the parlance – a sync track. This can be played back into the computer, and will override the internal metronome, causing the drums to be played in time with the tape. Mucho useful for live work with backing tracks and sequencers (464 owners don't have an external tape socket, they have a problem).

And now the bad news. Let's get back to the guy who sits at the back and bashes the skins. A certain reputation follows such people around. They are rumoured to be difficult to control, incomprehensible and rather unsubtle. Of course, as any drummer will tell you (given time and lots of monosyllables), this sort of thing adds to the spirit and charisma which makes an (almost) human riddim man so much better for his band than a computerised box.

Cheetah obviously agree. They've clearly worked hard at instilling these selfsame virtues into the software which comes with Amdrum. Maybe they've even hired a real live Ringo clone to write the instructions.

Maybe they think user friendly is something to do with groupies, 'cos there's not a lot of it about in the software. Right from the beginning, the software and documentation seem to conspire against the hapless user in his search for that perfect beat.

A full catalogue of woes would be both boring and out of place. A few examples will suffice. If you've got a CPC464 and a disc drive you might be expecting to transfer the software to disc – which takes the customary age to load in a rather boring screen, then a few aeons more to load in the program, and, just in case you had an urgent appointment in Aberdeen, spends another millenium loading in the kit. Unfortunately the Amdrum doesn't have a through connector, so go bang your bongo, ape man.

There is a handy tip in the handbook to the effect that you needn't bother loading in the title screen if you're transferring the program to disc. It stops short of telling you how to do this, and after 15 minutes' futile fight with a protected program it would have been quicker to load the bleeder in and have done.

There appears to be no way to transfer song files on tape to disc at all - once you've loaded the program off disc you cannot select tape as a filing system. That's assuming you realise that the program has loaded from disc, because it doesn't clear the screen and run, oh no indeed. Instead it emits a piercing shriek and sits there until you press a key with the screen still saying RUN "DRUM where you typed it in.

You press a key. Up springs a menu screen, offering you a choice of loading or saving songs, dumps or voices. It's not entirely clear that you have to press 5 (to load a voice), 9 ENTER (why 9 is never entirely explained either, although it does become clear after a day or so's swearing) and then AMKIT. Then you can load a demo song and play it. Playing the drums turns on the cassette motor for some arcane reason. No doubt it's one of these groupies we mentioned earlier.

The handbook then directs you to read two separate sections before going any further. It can't tell you where to find them, as there aren't any page numbers. Ah well, don't those drums sound nice?

The program is divided into pages, which control editing of patterns (which are yer basic rhythms), songs (groups of patterns) and loading/saving. In the pattern editing page, a pattern is displayed as a strip divided into beats.

Moving a bar over a part of the strip with the cursor and pressing from 1-8 for the drum sound you want causes that sound to be played at that point in the pattern. Pressing Shift and a number causes that sound to be removed from that point, and pressing D causes the pattern to be played.

Unfortunately the bar which shows where you are in the pattern doesn't move in time to the beat, so it can be difficult to tell just where that bum note is.

Tempo, in beats per minute, is displayed on this page, but can only be changed when the pattern is playing. But while the pattern is playing the screen doesn't change, so you can't set the tempo to an exact value. You can only adjust it until it sounds right and then stop the drums and see what value you hit.

Patterns can be linked together into songs. The way in which this is done is

CHAT



ISPEAK outputs the phonemes directly, so the enthusiastic can experiment with Headroomesque ut-tt-tt-terings and fine-tune phrases for peak performance. The pitch of the speech can also be directly set, from one to nine, with this RSX for vowels within the string, thus making for more interesting inflections.

Overall pitch is set by the eponymous RSX, and this has a usefully wide range.(A happy hour was spent writing a HAL 9000 emulator for my 664, but at the end of it the computer refused to open the disc drive door).

The documentation that comes with the software is short but explicit, covering all the major facets of running the synthesiser from Basic.

Three demo programs come with the package. DEMO enthuses about itself. SPELL has a go at the "Speak and Spell" type of game, and copes – cheat is such a nasty word – with the audio inadequacies by printing an example sentence with the spoken word discreetly replaced by seven dashes. SAYFILE takes an Ascii file (default extension of .DOC) and puts it through the text-to-speech convertor.

All three of these are well-documented, as are the other bits of Basic in the package, and one is encouraged to fiddle with them to one's own ends.

Also in the package is 27k's worth of notes with a little Basic program to leaf through them with, giving the technical more than enough information to interface the package to just about anything that's soft.

Memory maps, buffer allocations, entry conditions – it's all there in lucid prose.

Altogether a well conceived and implemented package. The merely curious will be able to get good results from it, and the more experienced should be able to make it jump through hoops.

At half the price of hardware-based speech add-ons, it must be worth a listen.

almost impossible to describe and is even worse to use. It involves generating a list of patterns and their associated number of repeats. The gory details aren't important but, just to give a flavour of the enterprise, pressing the left cursor moves the list to the right.

Leaving this page is accomplished by pressing Q (for Quit), an option which is not displayed. Other pages sometimes use R (for Return), which is. This sort of lack of consistency makes the program needlessly difficult to master.

The handbook doesn't help, omitting bits here, referring to the Spectrum there ("press CAPS SHIFT 0 to delete"), and generally being obscure.

The worst case of user-hostility is to be found in the LOAD/SAVE page. Complete sets of songs may be loaded or saved as a "dump". Dumps cannot be named, rather they can only have a number between 1 and 99.

Why? Who knows, but perhaps it's to increase the chance of the poor user – you or me – losing a computerful of composition. Because once you've selected LOAD DUMP – and it's only a single keypress – you HAVE to enter a correct number. Trying to ESCape won't work, and an incorrect number will just prompt an error message and a retry. Entering a correct number will load that dump. It will also wipe the computer of any pattern and song information that might be there. This is on a single keypress, adjacent to the SAVE DUMP key.

By the way, SAVEing a dump with a previously used number is another bad idea. It wipes the old dump from disc, and as two digit numbers aren't that easy to remember . . .

You might think that this means you have to look at the disc catalogue before saving. Wrong! There's no CATALOG function, so you can't check to see whether you've already got a dump called 46. Not just awful, more actively evil. Sorry if I sound annoyed, but losing three hours of work through pressing 3 instead of 4 does that to a man.

It's OK. I've calmed down a bit now. And it's summary time. On the plus side the Amdrum makes a wonderful noise. You can hear why the Specdrum sold 20,000. It's compact, reliable and new sounds are being released at respectable intervals.

On the minus side the software is idiosyncratic, incoherent and at times incredibly thoughtless. It almost, but not quite, ruins the product. The hardware is capable of great things. It could do full synthesis, not just drums. It could do speech. It could also do with an earphone socket, so one doesn't have to hook up the old hifi every time.

Somebody, somewhere, must be producing some software that will do all these things ('cept the socket, silly).

When that appears, buy this product. Until then, unless you really want a drum machine now this minute, wait a bit. Something this much fun shouldn't be this much hassle.

Music to your ears...

The Editor would like to apologise for the puns contained in this article. Blame Bill Hedley.

Bach in March time The Music System was reviewed in this organ. The sharp of eye who bought the program might have spotted the note in the manual to the effect that Printer and Linker modules would be available "early in 1986" – probably to stave off scores of complaints about hard copy or the lack thereof.

And here they are, on disc only, in the guise – as promised – of The Advanced Music System. Rainbird call them AMS, which is possibly not the most fortuitous choice of compaction, but if da capo fits . . .

Run the program, which has reverted to TMS on the disc, and you're faced with a very pretty screen with three choices and some gratuitous scrolling notes. The three modules so choosable are the Printer, the Linker and The Music System itself.

TMS hasn't changed much, only an EXIT option has been added to the Command menu to enable access to the Linker and Printer options.

The rest is the same as the original, so there is no problem either learning how to use it or importing old files you might have in stock. Hours and hours of work need not be wasted. There are also some more specially commissioned demo files of minim-alist music.

The Linker module allows the strong of earhole to make a liszt of up to 13 TMS music files, or sections, and play them in sequence. You can repeat each section as many times as you like, with variations on tempo, up to a grand total of 99. The lot can then be saved as a complete linker file.

As the 24 page manual says, this can be enough for several hours of playing time. You might think this a touch excessive. You might be right.

The really useful module is the Printer. This takes a file and – wait for it – prints it. Rather nicely too, in very acceptable Epson-compatible bit image mode.

The daring can add lyrics, dynamics – if that's your forte – and beaming. Beaming brings a smile to any musician's face. It involves joining up quavers and shorter notes into beat-size groupings to produce a much more readable score.

Two music files can be printed at once, giving up to six voices on a score, and bars can be split at end of paper or printed whole, giving a ragged right edge to the output.

The individual voices can be printed out separately on either the bass or the treble clef, so the trombone part can be given to the trombonist, the lead guitar part to the poseur of the group, and the vocal part to that rather nice bird in black you desperately want to impress.

What's more, it all works. There are a couple of loose ends. The manual claims that you can "press Esc at any time to abort printing". This is (mostly) true, but if the printer stops for any reason (Out of paper, said mine) the computer comes out in sympathy until the situation is rectified.

Also in the grump-producing game is the way in which the module behaves if it gets short of room when loading in files. It gets rid of any lyrics that might be cluttering up the place without asking the user.

It does, to be fair, tell the user that his meaningful lyrics have gone the way of the Bay City Rollers, and the manual does warn of the possibility, but it could have been done in a nicer way.

But these are minor niggles. There's nothing wrong with the key points.

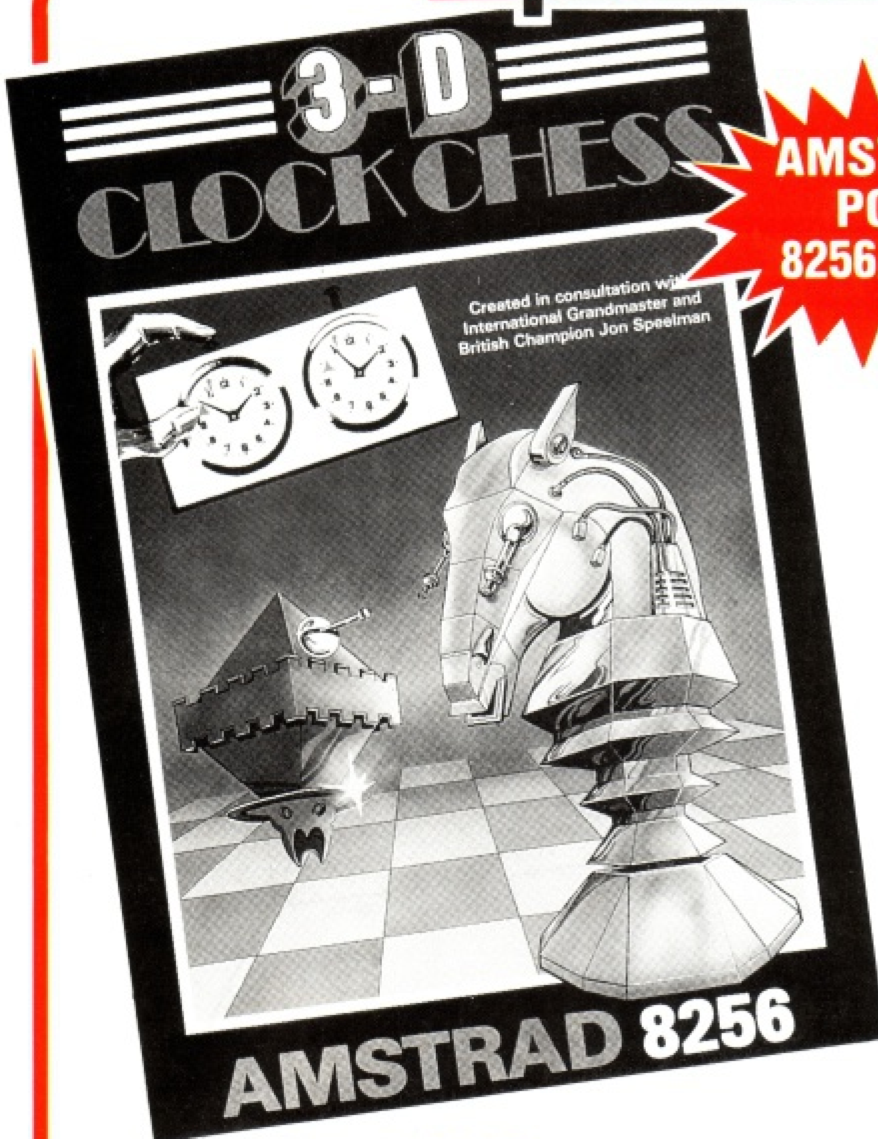
This package is absolutely perfect for anyone writing songs for a small band, or similar musical gathering. The scores photocopy well, are musically accurate and well presented.

The program as a whole has a venerable ancestry, and is very well thought out and easy to use. If you're into writing music at all seriously, then this is as essential as a word processor to a wordsmith. It's the best computer composition tool for the Amstrad, bar none.

It's just a shame that it doesn't come with that famous Judy Garland tune. You know the one. All together now . . . Some-where over the Rainbird (fade into silence) . . .

ACU

cp software



AMSTRAD PCW 8256/8512



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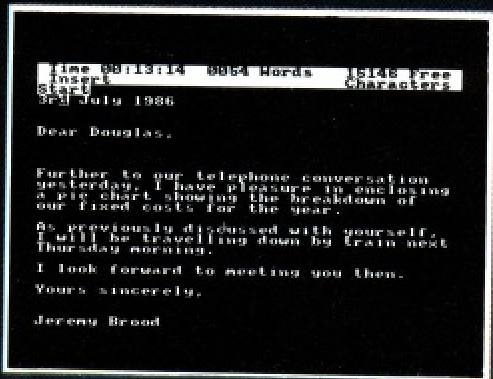
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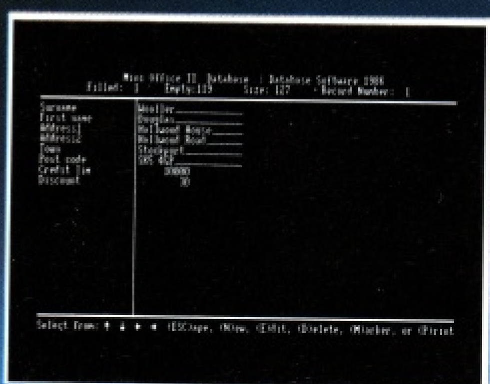
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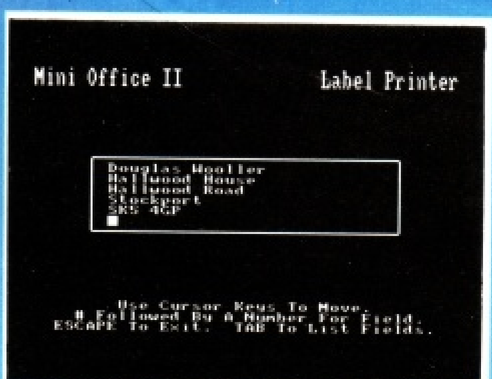


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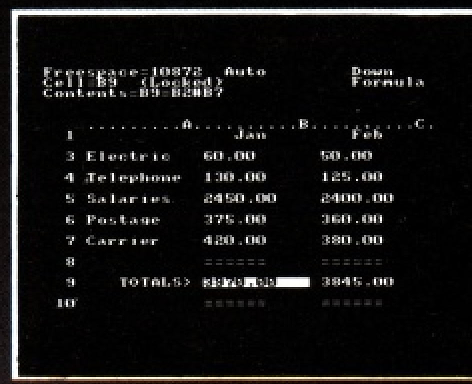
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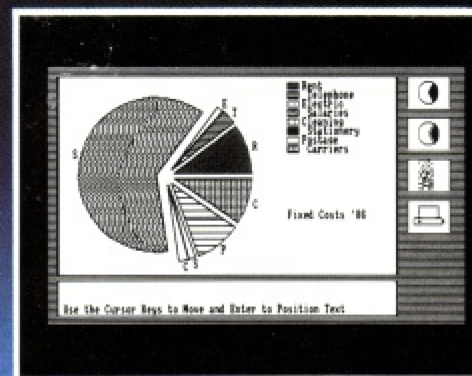
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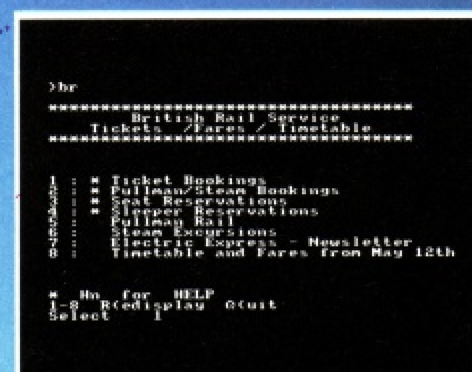
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ACU

COMPUTERISED CARTOONS

The April issue of ACU listed a DIY animation program – now Gremlin Graphics has gone a step better and produced a commercial program which goes much further. Rupert Goodwins draws his own conclusions.

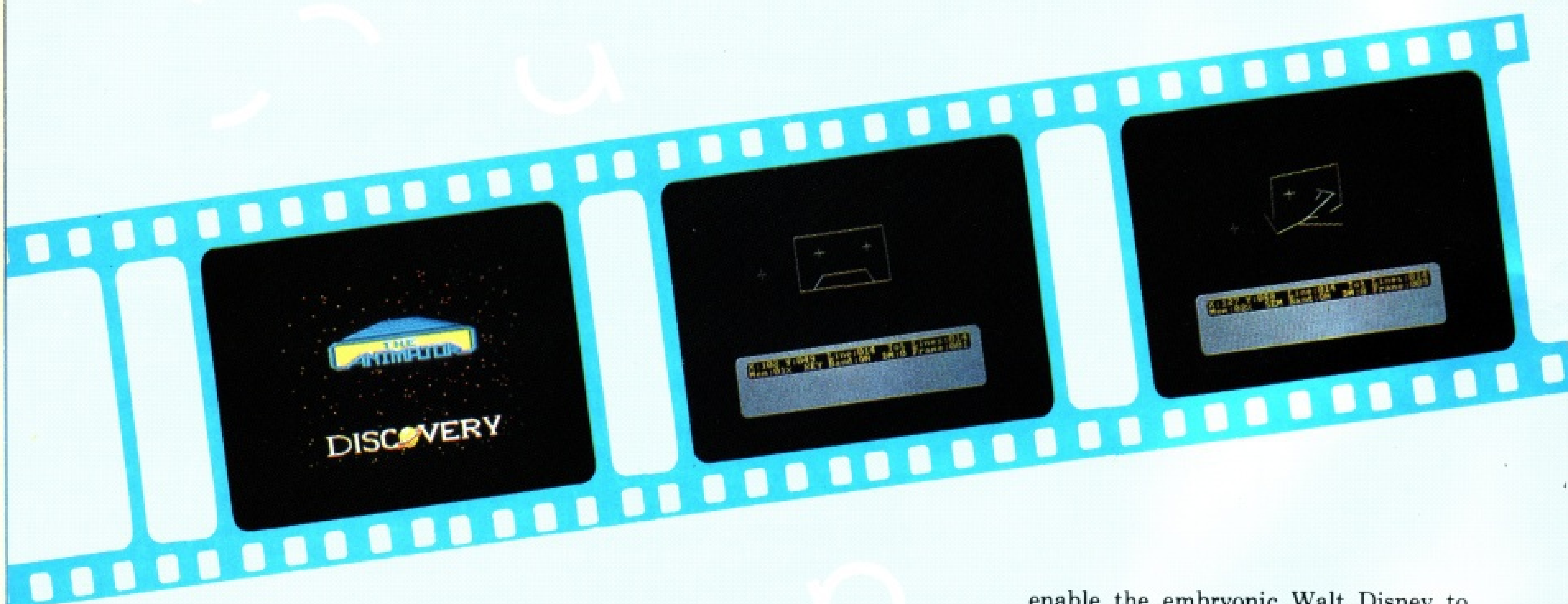
The phrase "A hundred lines!" can strike fear in even the hardiest of souls. But now there's software that might seem like a schoolboy's dream – not only does it make lines a pleasure, it takes all the hard work out of creating hundreds of the things.

Lest Norman Tebbit is reading this and feels moved to ban this atrocity before it removes the last vestiges of Victorian discipline from our halls of Académe, let's make it clear that these lines are graphic, not punitive.

The Animator, from Discovery out of Gremlin Graphics, is a utility by which line-based graphics can be created and animated. The basic idea is simple enough – draw a set of lines, called a frame, representing the start of an animated sequence, then draw the end result as a different frame.

The computer then generates all the intermediate frames, called "inbetweening", or just "tweening", and outputs them to the screen fast enough to create the impression of motion.

The Animator provides all the tools to



enable the embryonic Walt Disney to produce reasonable results with nothing inkier than a joystick – but that's not to say it's a Mickey Mouse product.

Taking first things first, the menu that appears when the program has loaded gives the user the options to save, delete, load and animate sequences – a sequence is a set of frames. It also allows said user to change the cassette write speed, but that's so boring it won't get mentioned.

The animate option prompts for the name of the sequence to be used – up to 24 can be held at once, and the ones currently available are listed below the menu – and then puts you into the Animation menu.

If you reply with the name of a non-existent sequence you are asked for a screen mode and then moved directly into editing, bypassing the Animation

menu. This allows you to set the current frame number, change screen mode, save data in either compacted – that is, finished, run-only – or editable memory-hungry format. It also selects various frame moves and copies, entry to the editor and to the animator proper. A compacted sequence is called a demo, and cannot be re-edited but can be used from Basic, on which more anon.

Each frame has a number, which is its position in the sequence, and is either a key or semi-key frame. Each sequence has at least two key frames, these being the frames between which the animator inbetweens. Lines are put on to the screen by moving a cross-hair about the screen with the joystick, pressing fire to select start and stop points. If you move the cursor in one direction for more than two seconds it speeds up – a nice touch.

A semi-key frame also defines points and lines in the animation, but is initially generated by the computer as part of the inbetweening. Lines that are part of the inbetweening process cannot be deleted from a semi-key frame, but they can be moved.

Herein lie some of the Animator's more powerful features. A line or block of lines can be selected and then transformed – flipped over, smeared, enlarged, moved or otherwise messed around with – and this can be used to create some impressive visual effects with minimal work.

Areas enclosed within blocks can be filled with colour and patterns, and these too can be inbetweened. This is precisely the technique used to create the Flyaway Four featured on a certain TV channel, and with a little diligent application you too can formulate something similar.

There are various options to help the weak of talent, like your reviewer, produce the goods, such as polygon and curve draw, rubberbanding – where you can move a line about before fixing the position – last line remove and various colouring bits.

There are three screen modes available to you raster rascals. Mode 2 is the same as the normal Amstrad Mode 1, and Mode 1 is the same as Amstrad's Mode 2. Brilliant.

Mode 0 is all Animator's own – a low-res two colour mode that's light on memory but heavy on speed (TV ad fame, here I come.)

The two Amstradian modes will show some flicker when used by the Animator, whereas Mode 0 uses a slightly more sophisticated technique and is guaranteed flickerless.

Once you've created your coruscating cartoon, what can you do with it? Animator comes with a run-time module, called Shell, which provides playback features from within Basic. As you might expect there's not a lot of memory left for a Basic program once the program and an animation or two have been loaded. The manual speaks blithely about leaving from 511 to 4000 bytes free. RSXs include GET to load in a demo (you can only save and load demos by number), ANIMATE, which actually runs the demo with various options, SETCOL, which sets colours and screen modes, SHOW, which displays a single frame and CLEAN, which clears out the demos currently loaded.

It also optionally selects a non-flicker animate mode for the multi-colour and high-res, but as this uses another 16k as a second screen this is unlikely to be a viable option for 464/664 owners. CPC6128 users have a better deal all round with this package. Having 81k for frame store instead of 17k makes a big difference.

The manual is somewhat coy when it comes to exactly how many frames can be stored. It quotes 500-600 for a two line sequence on a 6128, and then goes on to say that more detail uses more memory, and 464/664 owners have less to start with anyway. Useful, huh?

Experience is the best guide, aided and abetted by the Memory Free indicator on the Animator menu. About 50 frames of useful – 12 or so lines – picture seems to be the limit, but there are various economy measures detailed in the book.

My main gripe with this package, apart from the lack of memory, which the writers have done their best to circumvent, is the command structure. Menu items have numbers instead of useful letters, like E for Edit and so on, and while editing there is no indication of what to press to get which function, or indeed which functions are available.

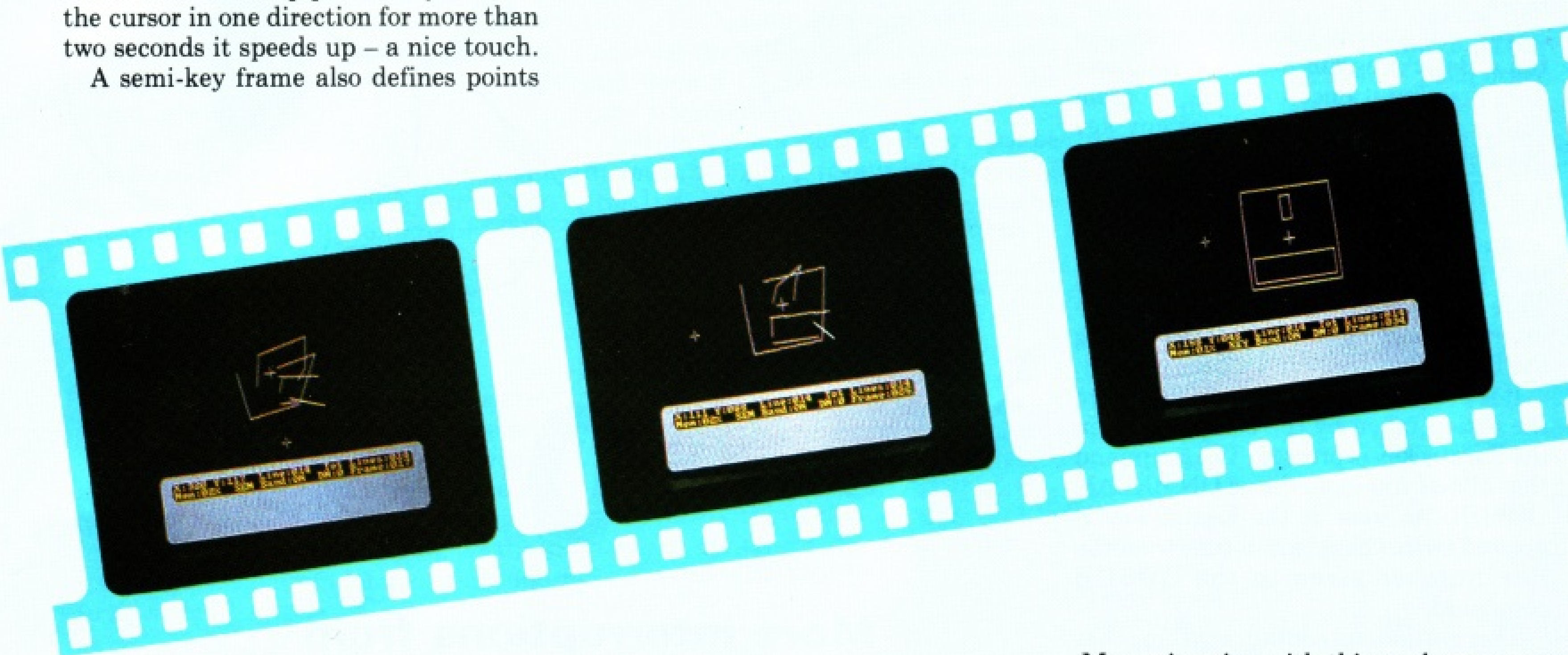
In part this can be attributed to the RAM squeeze, but a little more thought would have gone a long way.

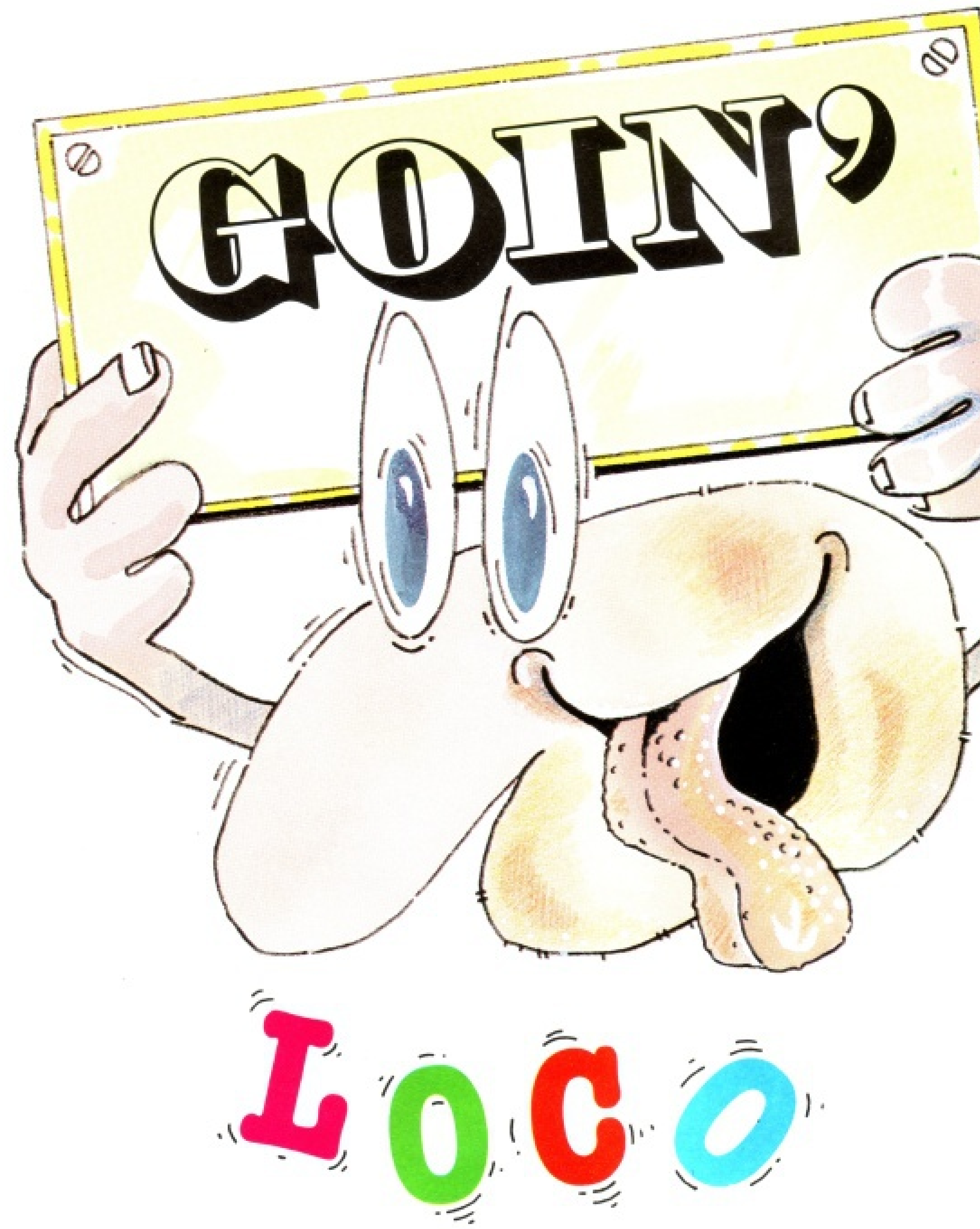
Another missing must is the ability to undo transformations after seeing them in animation. More undo options in general would be nice anyway.

To anyone who's ever used icon-based drawing utilities, the editing interface will seem very crude. Nevertheless the end results can be eye-catching, fast, smooth and impressive. Just the thing to title those videos with.

Now an Animator II with a graphic command interface, running on the 6128 only, or even an Immensely Bigger Machine, would be something to see.

ACU





More interruptions from Alexander Martin

Last month we looked at the basic interrupts available on the CPC machines. We covered AFTER and EVERY, the general purpose interrupts, Di and Ei, the commands that temporarily disable and re-enable the interrupts, and Remain, which is used to switch off an active interrupt. We also covered timers and their priorities.

Locomotive Basic has two more interrupts that we will now cover. The first is the break interrupt.

When an interrupt is enabled or set up the computer is constantly testing for some event, like a timer reaching its required time. The thing that the computer is testing for with a break interrupt is the Escape key to be pressed twice.

You will already know that when you run a Basic program to stop it you press Esc. Pressing it once halts the program with a cursor displayed. Press any key but Esc and it starts again.

Press Esc and the program stops with the message "Break in line 50", or whatever line it is. It doesn't matter what the program is doing, this always works. This is because Basic has its own interrupt that is constantly examining the Escape key to see if it's been pressed.

It is possible to add your own routine to the action taken by the computer when the Escape key is pressed. The command that allows you to do this is ON BREAK GOSUB. As soon as the Escape key is pressed twice the program runs from the line number given in the GOSUB command.

This routine can contain anything that you like. The obvious uses for it are interrupting a running program at any point to do something else, developing a program, and preventing a finished program from being halted by the Escape key.

To illustrate the first use imagine a game in which the idea is to fly round the galaxy zapping aliens. A screen can be set up on which all the alien zapping takes place.

In the middle zapping aliens, pressing Esc could bring up a menu of options, such as navigating to a different galaxy, refuelling or whatever. The subroutine would finish with a Return and the zapping could continue.

This has lots of uses, whether in games or serious applications. Pressing Esc could print out the current subtotals of yearly profits.

The second use, when developing a program, is the one that ON BREAK GOSUB is most commonly used for. It is very annoying, when writing a graphics program that perhaps uses strange colours, pens and a Mode 0 screen, to test a program by running it and breaking out, only to find yourself reading red writing on a green background in 20 columns.

By putting in a routine that resets all the default colours and the screen mode, you save a great deal of time. If no Return command appears at the end of the routine the program will stop as normal. See the listing later on for an example of this use.

You can prevent a program being "broken out of" by putting in an ON BREAK that goes to a routine that is simply a Return. It is worth pointing out that any program with a continuous loop that also has a break subroutine with a Return at the end is impossible to break out of. The only way to get rid of such a program is to reset the computer. Incidently, a much better way to disable the Esc key is by redefining it. The command Key Def 66,0,255 will stop Escape working without getting the cursor on the screen. Shift and Esc or Ctrl and Esc will still work unless you change the command to Key Def 66,0,255,255,255.

The following program is "unbreakable". Remember to save it before you run it.

```
10 a$="The world's most boring program!!
   !!....."
20 b$="and you can't get rid of it!!!!..
   ......."
30 '
40 ON BREAK GOSUB 160
50 store$=a$+SPACE$(20)
60 scroll$=SPACE$(80)
70 pointer=50
80 MODE 1
90 LOCATE 1,5
100 PRINT scroll$
110 MID$(scroll$,1,40)=MID$(store$,point
    er,40)+MID$(store$,1)
120 pointer=pointer+1:IF pointer>LEN(sto
    re$) THEN pointer=1
130 GOTO 90
140 '
150 '
160 IF done THEN RETURN ELSE done=-1
170 store$=store$+b$
180 RETURN
```



There is a command to deactivate a break interrupt in a program. This is ON BREAK Stop, and it puts the break interrupt back to simply breaking out of the program.

I Like the sound of this

The final interrupt that we will cover is the sound interrupt, This is a more complex interrupt than the break interrupt and more specialised. It is designed to allow continuous background music to be played while a program is running or some continuous sound to be generated.

To fully understand this interrupt you will need to know about the Sound command, which adds a sound – either a note or noise – to one or more of the three sound queues. In all of these examples the sound is being added to the first sound queue.

The first parameter of the Sound command is the queue to send the sound to. The second and third parameters cover tone and duration, telling the sound command what note to play and how long for.

Form a queue

There are three sound queues, so a stereo effect can be created by sending sounds to the different channels. Each queue is like a chocolate machine with space for four bars of chocolate. As each sound is made the next one moves down, creating a space at the bottom for another sound to be added.

Playing Lizst

To play a piece of music a list of sounds, each with a different tone and duration, must be processed one at a time. As there are only four places in the queue the sounds cannot be added all at once and the program must add them as they are needed.

If a sound queue is full and the program attempts to add another sound, it will have to wait until there is a free space in the queue before it can add it. This means that the program is stopped while a sound is being made. In a game which relies on movement this would be very irritating.

There is command for testing whether there is free space in a sound queue, but the sound interrupt provides a much more elegant solution.

The sound interrupt is started by the command On Sq(n) GOSUB x. The parameter n specifies which sound queue is to be tested. This parameter can be 1, 2 or 4. As soon as the sound queue has a free entry the subroutine at x is called. This subroutine can contain anything, but usually it will always have a Sound command in it.

Bang, bang!

The sound interrupt is a "one shot interrupt", like an AFTER rather than an EVERY. It will only work once and then be switched off.

Like the break interrupt, waiting for the Esc key to be pressed, the sound interrupt is simply waiting for a free slot in a sound queue. So to have continuous music, it is necessary to have another On Sq command in the routine that is called.

To set up a program with continuous music it is necessary to have a list of notes containing tone and duration. There must be a pointer to the list or some means of reading the list one note at a time. The sound interrupt subroutine must use the pointer to read the next note and issue a Sound command with the right parameters.

Within the routine the pointer must be incremented and if it falls off the end of the list it must be started at the beginning again. The sound interrupt has to be reactivated with another On Sq command and then the routine can be finished with a Return.

The following demo program illustrates this with a few refinements. There is an AFTER command to produce a delay before the music starts again and of course some animated graphics to show that there is no noticeable delay in the program. There is also an ON BREAK command to put you back to editing the program.

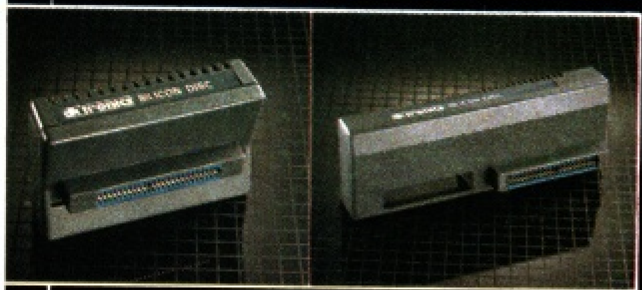
There are some extra things to know about using sound interrupts. Using a Sound command and the Sq function – which I haven't introduced – both disable any sound interrupt for that queue.

You can have a sound interrupt for each of the sound queues, making three altogether. If you wanted, you could have three tunes playing against each other.

As explained last month, each interrupt has a priority. The break interrupt has the highest priority of all. Each of the sound interrupts has equal priority with timer 2.

```
10 'data for tune
20 '
30 DATA 0,0,478,10,478,5,478,5,478,10,56
   8,10,358,10,358,5,358,5,379,10,426,10
   ,478,10,478,5,478,5,426,10,478,5,478,
   5,478,10,536,5,568,5,638,10,716,5,638
   ,5,568,10,568,5,568,5,638,10,638,10,7
   16,5,638,5,568,5,716,5,851,5,758,5,71
   6,10,956,10,716,5,568,5,478,10
40 DATA 536,5,568,5,638,10,638,5,638,5,7
   16,10,716,50
50 '
60 'start program
70 'set up sound
80 '
90 DEFINT i
100 ON BREAK GOSUB 610
110 DIM it(46),id(46):np=1
120 FOR n=1 TO 46:READ it(n),id(n):NEXT
    n
130 ENT 1,1,0,255
140 ENV 1,5,1,1,1,0,2,30,-1,4
150 ON SQ(1) GOSUB 540
160 MODE 0:PAPER 10:CLS:PEN 12:PRINT STR
    ING$(40,143);:PEN 9
170 '
180 'set up animation
190 '
200 SYMBOL 254,48,64,0,0,0,0,0,0
210 SYMBOL 255,248,112,48,28,24,16,0,0
220 SYMBOL 252,0,0,1,3,7,3,15,25
230 SYMBOL 253,0,192,128,0,192,224,224,2
    28
240 SYMBOL 250,31,14,12,56,24,8,0,0
250 SYMBOL 251,12,2,0,0,0,0,0,0
260 SYMBOL 248,0,0,128,192,224,192,240,1
    52
270 SYMBOL 249,0,3,1,0,3,7,7,39
280 DATA 254,255,11,8,8,252,253,250,251,
    11,8,8,249,248,32,32,11,8,8,32,32
290 FOR n=1 TO 7:READ r:rroo$=rroo$+CHR$
    (r):NEXT n
300 FOR n=1 TO 7:READ r:lroo$=lroo$+CHR$
    (r):NEXT n
310 FOR n=1 TO 7:READ r:blank$=blank$+CH
    R$(r):NEXT n
320 up=5:addup=1
330 '
340 'animation loop
350 '
360 FOR across=1 TO 19
370 up=up+addup:IF up=4 OR up=7 THEN add
    up=-addup
380 GOSUB 480
390 t=TIME:WHILE t+50>TIME:WEND:CALL &BD
    19:GOSUB 500
400 NEXT across
410 FOR across=19 TO 1 STEP -1
420 up=up+addup:IF up=4 OR up=7 THEN add
    up=-addup
430 GOSUB 490
440 t=TIME:WHILE t+50>TIME:WEND:CALL &BD
    19:GOSUB 500
450 NEXT across
460 GOTO 360
470 '
480 LOCATE across,up:PRINT USING"&";rroo
    $;:RETURN
490 LOCATE across,up:PRINT USING"&";lroo
    $;:RETURN
500 LOCATE across,up:PRINT USING"&";blan
    k$;:RETURN
510 '
520 'sound interrupt subroutine
530 '
540 np=np+1: IF np=46 THEN np=1: AFTER 1
    00 GOSUB 560:RETURN
550 SOUND 1,it(np)*0.5,id(np)*3.5,10,1,1
560 ON SQ(1) GOSUB 540
570 RETURN
580 '
590 'escape subroutine
600 '
610 MODE 2:LIST 410-
```

256K SILICON DISC



This is the fastest storage system available for Amstrad CPC computers and is compatible with CPM 2.2, CPM+ and all DK'Tronics peripherals including the 64K/256K memory expansions. When used with CPM+ and our 256K memory the edition disc capacity is a massive 442K (more than the PCW 8512 Ram Disc). It automatically logs on as drive B or drive C in two drive systems and does not require extra power supply.

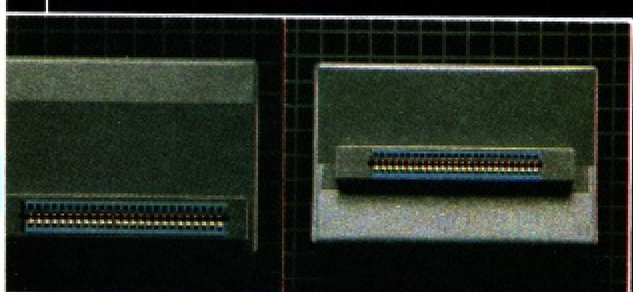
The 256K Silicon Disc is designed to be used with at least one normal disc drive attached. When fitted the directory uses 2K thus leaving 254K for storage, over 70K more than the normal discs.

Data and programs can be exchanged between the Silicon Disc and a normal disc, application programs can then work on the data at vastly increased speed especially on systems with only one normal drive.

Software is contained in an expansion ROM and there are two environments in which the Silicon Disc can be used, BASIC under AMSDOS where all the normal AMSDOS commands are fully supported LOAD, SAVE, MERGE, CAT etc and within CP/M 2.2 CP/M+ where commercial programs are designed to run on multi drive systems.

£99.95 including VAT (464 and 6128)

64K and 256K MEMORY EXPANSIONS



The memory expansions increase the Amstrad 464's internal memory to give a total of 128K or 320K. The 621's memory is increased to 320K. It is compatible with all DK'Tronics peripherals including the 256K Silicon Disc.

It is supplied with bank switching RSX software (464 software on cassette 6128 on disc.

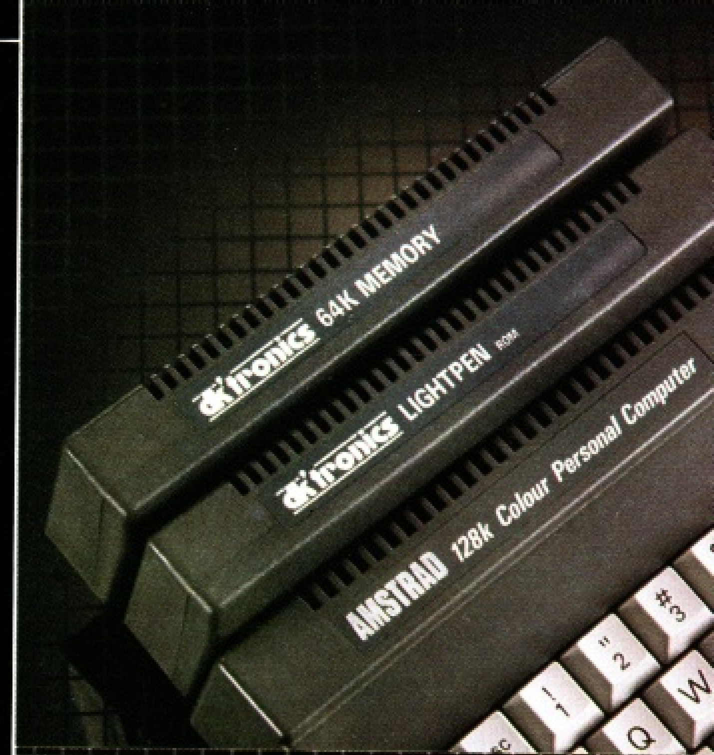
The software adds some BASIC commands which makes it possible to use the second 64K (or 3rd or 4th and 5th in the case of 256K) for storage of screens, windows, graphics and basic arrays. This ability means that you can write much larger basic programs and sophisticated programs that use pull-down menus with ease.

With an expansion fitted on the 464 it then has the same memory configuration as the CPC 6128. It will then run CPM+ with its massive 61K T.P.A. area, opening up an even larger software base to 464 users. When using either of the expansions with CPM 2.2 on the 464 and 6128 computer the T.P.A. is increased to 61K.

The RAM is accessed by means of bank switching using a single I/O port. Memory is actually switched in and out of the 64KZ80 address space in 16K sub blocks (as are the ROMS). The port determines which particular combinations of the original four 16K sub blocks and any new sub blocks from the expansion RAM will occupy the 64K address space at any time. All of this switching is done automatically by the software supplied.

The contents of the expansion RAM are retained if the computer is reset and if the RAM is used for machine code the contents will remain even if the computer crashes.

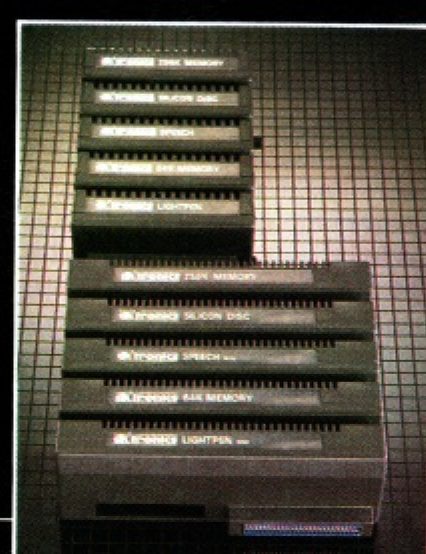
64K **£49.95** including VAT (464 only)
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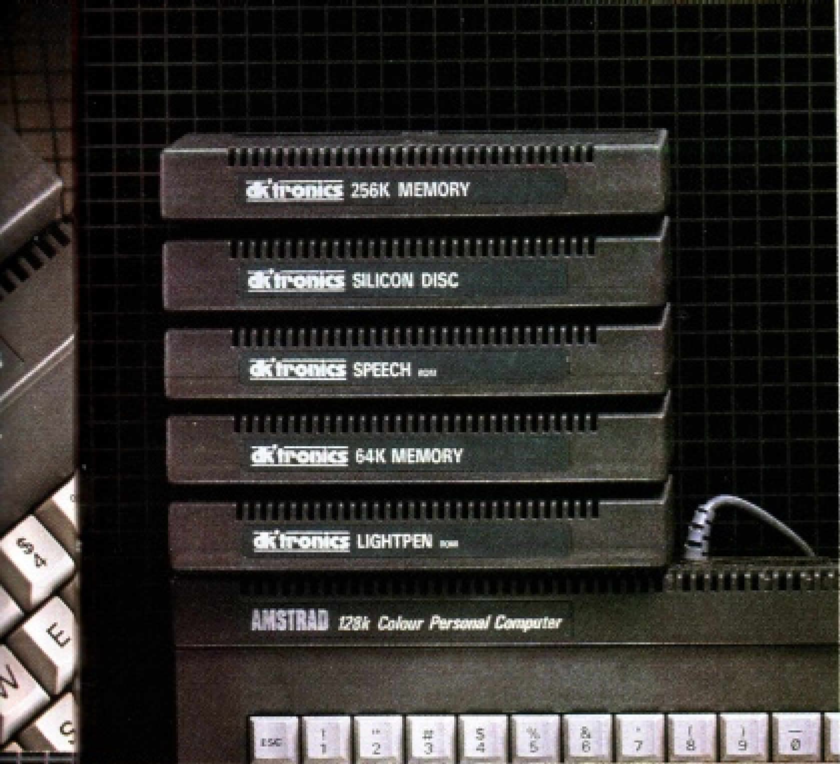




L E A
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DK'Tronics have produced this
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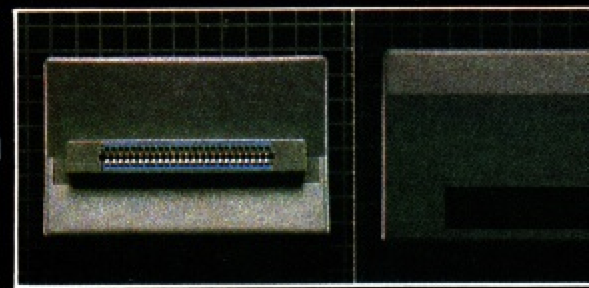




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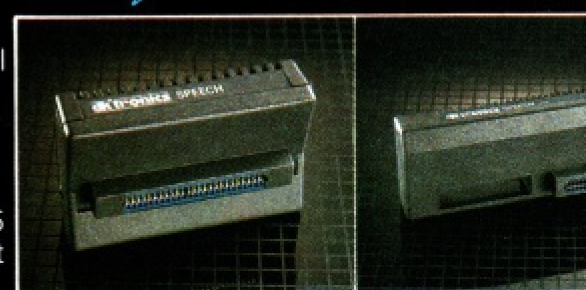


The sophisticated graphics package includes a colour palette, nudge control for one pixel accuracy, brush choice, text handling and user defined characters.

- It can magnify, shrink, colour fill and create circles, rectangles, lines and curves.
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In the air tonight

Fancy a flight of fantasy? All you need is the right software and you can launch your CPC into the wide blue yonder. John Baker is your test pilot.

You can usually guarantee that the majority of computer users possess the following four programs: Othello (sometimes known as Reversi – for some mysterious reason, always included in starter packs), Pacman (same reason), an assembler (bought either by a misguided relation or the user themselves in a fit of intellectual elan), and finally a really bad flight simulator.

Jerky as the average municipal bus ride, twice as slow and half as interesting, it generally gets transferred to the same dark corner as the assembler, never again to see the light of day. Luckily Amstrad owners aren't average, eh?

We are fortunate in that, by the time Arnold appeared on the scene, the ZX81 and Mk 1 Spectrum flight simulators had long been forgotten, the programmers had learnt by their failures and the results that appeared either as conversions or originals were so much better than the early material for other machines. Good for us then, but why buy a flight simulation in the first place?

The two main reasons for buying one are, again, common to most of us – poverty and cowardice. Flying



Biggles



Spitfire 40

lessons are expensive, even if you are lucky enough to live near an airfield, and naturally, if you crash for real, it's the big game over for you.

Combine this with the fact that almost all the simulations we could find also allowed you to shoot, maim and kill to your heart's content. It would appear that they also offer a safe(ish) vent to the seething mass of bloodlust and violence that lurks beneath the surface of any Amstrad owner – well, at least, every 664 owner I know.

On to the games then, each of which has been rated on complexity – flying isn't suppose to be easy you know!, speed, graphics and finally, an overall Biggles factor to round it off. Let's start with the man himself.

Biggles

Mirrorsoft

Wizard prang chaps, tally-ho, watch out for Jerry dropping cabbage crates at four o'clock men, etc, etc.

Biggles – the game of the film – only just creeps into the category "simulation". You'll remember that the package consists of two games. Firstly there is Timewarp – which confusingly is made up of three sub-games, and secondly The Sound Weapon, which has you flitting around the trenches in a helicopter.

As is the usual format for simulators, the top half of the screen is given over to an out-of-the-cockpit view of the proceedings, with the lower portion devoting itself to instruments, status screens, and so on.

The instruments give the basic information, with easy to read digital displays, bearing, air speed, vertical speed, fuel and damage levels and altitude, together with a map display – which can be toggled from detailed to general coverage – and icons displaying the personnel and equipment aboard.

The latter gives the game away as far as any claim to be a true simulation, for The Sound Weapon is more an arcade adventure/treasure hunt, as you manoeuvre around the Western Front, ferrying people to and fro, picking up and dropping items in an attempt to thwart various evil plans. Not that the implementation is at all shoddy. The action is fairly fast and smooth and fairly colourful, but all the controls are via joystick, and there is little actual feeling that you are supposed to be piloting a helicopter – it could be anything from a flying carpet to a supersonic jet.

Complexity 4/10
Speed 7/10
Graphics 6/10
Biggles Factor 4/10
Comments – Not really a simulation, but a fun flying game all the same, and you have got Timewarp on the other side of the tape.



Fighter Pilot

Spitfire 40

Mirrorsoft

Another offering from Mirrorsoft, this time 30 years on...errr...or is it 40 years back? This time travel business gets very confusing. In any case, the time is firmly fixed at Summer 1940 and you are a Flying Officer at the controls of a Supermarine Spitfire stationed "somewhere in the South East of England". On loading, the program offers three choices – practice, combat and combat practice.

The latter places you several thousand feet in the air with Jerry right on your tail – but don't worry about it too much, as their hits won't count. This is just a practice session to get used to the controls and the manoeuvres you'll be needing in real combat situations.



Spitfire 40

Combat starts you off on the runway, with orders to intercept and destroy a number of enemy fighters at a certain altitude and bearing – but this time, if you get shot, you tend to fall out of the sky. Maybe what you need is lots of practice, which allows you to get used to the take off and the considerably more difficult landing procedure. Landing safely is an important part of the game, as you only get the flying hours and kills recorded in your log book if you do so.

The scenario is pretty straightforward the, but what about the authenticity of the controls and the actual feel of the simulation?

For once, the instrument panel is given a separate screen of its own, with an authentic Spitfire layout. You can toggle between this display and the cockpit view – from which all the shooting goes on – by firmly pressing the spacebar. All the expected instruments are there – and one or two others besides, such as an indicator showing the positioning of the rudder.

Actual control of the aircraft is implemented with a combination of keyboard and joystick. Roughly speaking, you point and fire with the joystick, and take care of flaps, brakes, throttle, and undercarriage via keyboard.

The final keyboard control shows you a map of the South East, with you and the Hun shown on it – and the location of your airfield.

The controls are detailed enough to take some learning, but gentle enough so that mistakes are not punished too hard – quite a good balance, particularly for younger budding pilots. Speed is adequate rather than breathtaking, but I can assure you that it seems at least a whole order of magnitude faster than the Commodore version of the same program.

Complexity 6/10
Speed 7/10
Graphics 6/10
Biggles Factor 6/10
Comments – Not a bad buy, particularly if you're looking for something that'll be a challenge without being too difficult.

Dambusters

US Gold

From one WWII epic to another, in this case the exploits of Guy Gibson, et al, of 617 squadron over the Ruhr valley. This puts you in control of a whole crew aboard a Lancaster. There is the pilot – with the out-of-the cockpit view – from which you control the direction and pitch of the aircraft with the joystick, the front gunner – also acting as bomb aimer – the tail gunner, the navigator – who plots the optimum course to target, avoiding high concentrations of flak, and so on – and the engineer, who must nurse the engines all the way across Europe. All on-screen controls can be accessed via joystick controlled cursor.

Coordinating all these screens can get horrifically difficult, requiring one whole load of concentration, particularly on the actual bombing approach to the dam. Adjust your airspeed via the engineering screen by juggling with the throttles and boosters, start the bomb spinning, adjust height using the bomb aimer screen, watch out for the flak, check that you are on course – pilot screen – and use the distancing sights to know when to finally release the bomb. And that's only if you made it across Europe in the first place!



Dambusters

To make things a bit easier, you are given three options on start up – practice dam approach, English channel – when you begin in flight over the great divide – and the full squadron leader option, in which you have to take off first. Take my word for it, whatever option you choose, it's not gonna be easy, pal.

To fit so much in the game, compromises had to be made – in this case, graphically, but very cleverly. The mission was a night flight – so the surface of the land is represented by a series of yellow dots – obviously the blackout wasn't rigorously applied on the Continent. Despite the sparseness of the display, it's very effective.

Unlike Spitfire 40, the game isn't played realtime – that is, it doesn't take three hours to get to the target. The actual feel of the plane is suprisingly real – I liked this one a lot.

Complexity 8/10
Speed 6/10
Graphics 6/10
Biggles Factor 8/10
Comments – You'll find yourself getting right into this one. Goggles down and chocks away!

Strike Force Harrier

Mirrorsoft

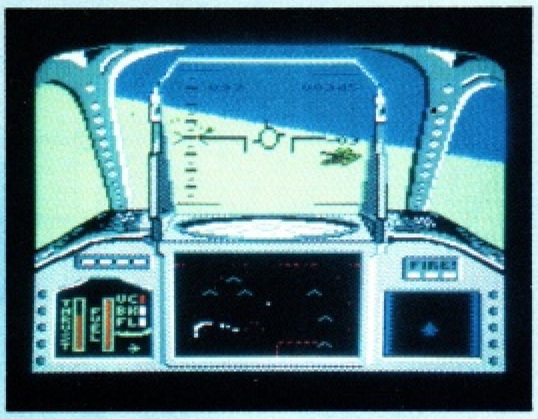
On to more modern day simulations – the first being Strike Force Harrier. Here you are flying the celebrated Harrier Jump Jet, well known for its ability for VTOL (Vertical Take Off and Landing). And boy, are you in trouble.

Single handed you must clear a vast tract of land and ultimately destroy the enemy base. Tricky stuff – particularly as the Harrier isn't the easiest thing in the world to fly.

The instructions are comprehensive and take you through your various instruments, weapon systems and finally the manoeuvres you'll need to master to survive against the spritely opposition.

The action takes place on a single screen, containing radar and the like on the lower portion – but this time quite a few of the essential indicators are placed on a head-up display, superimposed on the view from the cockpit, on the upper portion of the screen.

Controls are keyboard only, or a combination of joystick and keyboard – and are easy enough to master once you get the hang of it. Responsiveness is good and the opposition can get pretty smart. Messing around with the



Strike Force Harrier

orientation of the jet nozzles can produce some pretty startling results. If you've ever wanted to get some idea of what it feels like to pilot a Harrier then this is highly recommended.

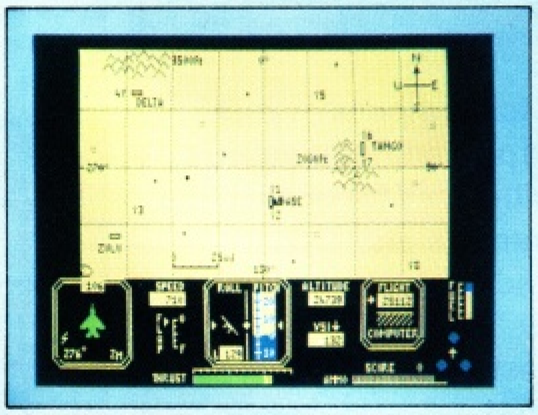
Complexity 7/10
Speed 7/10
Graphics 6/10
Biggles Factor 8/10
Comments – Good stuff, and you won't get bored with it.

Fighter Pilot
Digital Integration

Digital Integration has made simulations the speciality of the house, so you'd expect this one to be good.

Another realtime simulation, the performance of the program is supposed to simulate an American F15 Fighter.

Starting options include practice and full combat modes – and if you're feeling really lucky, you can try flying



Fighter Pilot

in fog (blind landing) or choose cross winds and turbulence to add a little spice to the proceedings.

Apart from that, this is a no frills, straightforward simulator, which has obviously had a great deal of research and detail put into the programming.

Surprisingly enough, the only weapon system available to the pilot is straightforward cannon fire. This only goes to emphasise that, if anything, this is more a flight than a full blown combat simulation.

Controls are not overly complex, but very responsive, and I was impressed by the feel of the thing.

Complexity 7/10
Speed 8/10
Graphics 6/10
Biggles Factor 7/10
Comments – Simulators don't come more workmanlike than this.

Tomahawk
Digital Integration

Another Digital Integration production, this one places you at the controls of an Apache Advanced Attack Helicopter – and it's very authentic indeed.

Enough controls to satisfy the most hardened fanatic, playable enough – with practice – to make an enjoyable game, this is well worth seeking out.

Taking off doesn't simply rely on increasing a throttle, there's the collective lever to control the amount



Tomahawk

of lift. Masses of kit onboard to zap the enemy, sophisticated navigational and target identification systems, all this and a genuine 3D world to fly about in. What more do you want? I don't want to write about it. . . I want to go back and play it!

Hosts of options and difficulty levels – if you want one combined flight and combat simulator, then this is the present state-of-the-art.

Complexity 8/10
Speed 9/10
Graphics 8/10
Biggles Factor 9/10
Comments – If you have to buy one simulator now, you won't go wrong with this one.

Combat Lynx
Durell

Aircraft simulators are one thing – all planes have a certain inherent stability for a start, that being the wing itself – but helicopters are another matter.

To fly a helicopter, you need a pilot's licence just to step in the cockpit. This suggests that, maybe, helicopter simulations should be considerably more challenging than straight flight simulators.

To be fair to Durell, Combat Lynx doesn't set out to be be a true helicopter simulation – they call it an air to ground battle simulation", in which you must distribute reinforcements around a battlefield, ferrying the injured back to base, while trying to find time to shoot up the enemy forces in between.

Flight controls are mainly by joystick, with weapon selection and throttle being controlled by keys.

Graphically, this is a very impressive program. There is no out-of-the-cockpit view: You get a view from



Combat Lynx

directly behind the helicopter, with the undulating landscape rushing by in glorious 3D. A static vertical strip on the left hand side of the display shows your height above the ground.

This display can be toggled to a map display showing a small portion of the playing area, which is big. Played in real time, this means it takes a while to move from base to base, so it's vital to have some kind of strategy.

A number of weapon systems can be carried, although it goes without saying that if you're carrying a surfeit of hardware on board, you won't be able to carry many reinforcements.

Complexity 6/10
Speed 8/10
Graphics 8/10
Biggles Factor 8/10
Comments – A good combination of wargame and arcade/simulation.

Sky's the limit

None of the programs is ever going to teach you to fly – or teach you to become a fully paid-up member of the armed forces either – but how could they? The real simulators cost £4-5 million!

Still, what you can get for your money are some programs that you will find a challenge to both your intellect and your reflexes – and give you a small taste of what it might be like to take that giant leap into the skies. See you at 5,000 feet!.

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HELICOPTER



In this exciting helicopter game from Brian Round, you must complete eight levels to win the game.

On level 1 use Z,X and Copy to control the helicopter. Pick up the bricks and place them on the wall before the dam overflows. Bricks that are in the way can be destroyed by landing on them and pressing the spacebar.

On level 2 you must guide the helicopter through the cave pressing Copy to go up and releasing it to descend.

On level 3 use Z and X to line up with the man and press Copy to release the hook. You have 10 attempts to save five people.

As the helicopter flies overhead on level 4, press Copy to release the bomb to blow up the reactor.

On level 5, as you control the man from inside the helicopter, you must build the bridge before the alien falls to its death.

Avoid the sides of the cave as you fall on level 6 using Z and X.

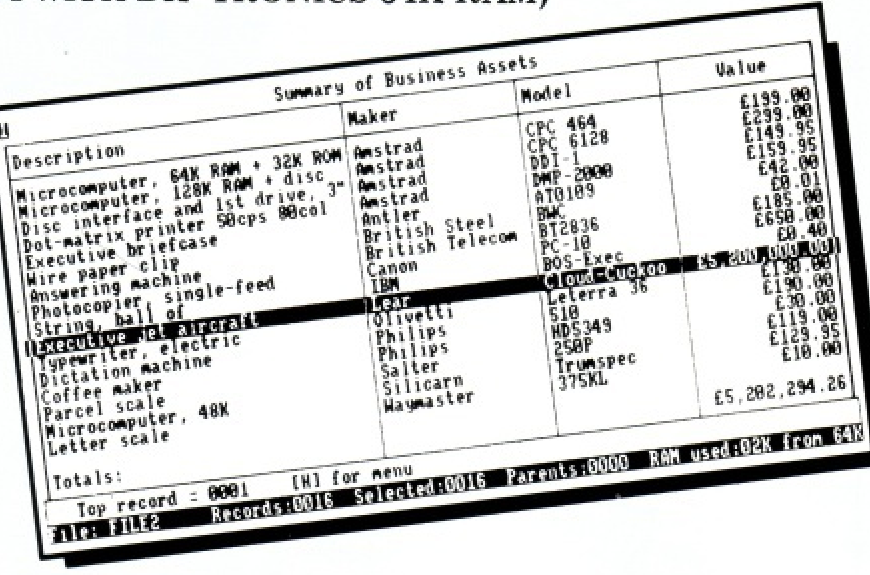
To enter Earth's atmosphere on level 7 you must hit the right entry point. Press Copy to ascend.

On Level 8, land the spaceship on the landing pad and you've won. Press Copy to start the spaceship and let go when you think your timing is right.

```
4 sc=0
5 DIM hs$(20):DIM hs(20):FOR f=1 TO 20:h
  s$(f)="?????":hs(f)=1050-(f*50):NEXT f
6 DIM cc(7):FOR f=1 TO 7:cc(f)=f:NEXT f
7 RESTORE 7534:DIM co(7):FOR z=1 TO 7:RE
  AD q:co(z)=q:NEXT z:GOTO 9350
8 pu=0:wal=11:db=224:ENV 1,5,3,5:ENV 2,1
  5,-1,4:ENT 1,15,-1,4
9 GOSUB 9200:GOSUB 9000
10 MODE 0:INK 3,13:INK 4,22:PEN 3:PAPER
   4:INK 0,1:FOR q=1 TO 20:LOCATE q,20:P
   RINT CHR$(135):NEXT
11 BORDER 1
12 INK 6,9
20 FOR f=2 TO 19:LOCATE 1,f:PRINT CHR$(1
   35):LOCATE 20,f:PRINT CHR$(135):NEXT
21 fs=0
30 LOCATE 1,1:FOR q=1 TO 20:LOCATE q,1:P
   RINT CHR$(135):NEXT
40 FOR f=12 TO 19:LOCATE 13,f:PRINT CHR$
   (135):NEXT f
45 FOR f=14 TO 19:LOCATE f,5:PRINT CHR$(
   135):NEXT
50 INK 5,16:PEN 5:PAPER 0:FOR q=1 TO 25:
   x=INT(RND*10)+2:y=INT(RND*15)+3:LOCAT
   E x,y:PRINT CHR$(138):NEXT q
90 wl=96
95 INK 9,5:INK 10,23:WINDOW #1,1,20,21,2
   5:PAPER #1,9:PEN #1,10:CLS#1
110 x=18:y=4
111 PLOT 607,96,6:DRAWR 32,0,6
120 INK 7,8
125 b1=INT(RND*10)+2:b2=INT(RND*9)+3:LOC
    ATE b1,b2:CALL &A000:IF CHR$(PEEK(&A
    007))<>" " THEN 125
126 IF wal=4 THEN FOR d=1 TO 8:SOUND 4,1
    06,-1,0,1,1,15:NEXT:CLS#1:LOCATE#1,6
    ,1:PRINT#1,"WELL DONE!":LOCATE #1,1,
    3:PRINT#1,"Phase >1< Completed.":GOT
    O 600
127 PEN 3:PAPER 4:LOCATE b1,b2:PRINT CHR
    $(135)
130 PEN 7:PAPER 0:LOCATE x,y:PRINT CHR$(
    129)CHR$(130)
131 wl=wl+1
132 PLOT 416,wl:DRAW 606,wl,6
133 IF wl=db THEN PLOT 416,wl,6:DRAWR -3
    3,0:DRAW 383,96,6:FOR f=96 TO wl:SOU
    ND 1,1,1,2,0,0,10:PLOT 33,f,6::DRAW
    383,f,6:NEXT f:GOTO 9300
140 a=x:b=y
150 IF INKEY(9)=0 THEN GOSUB 300:GOTO 17
    0
160 GOSUB 350
170 IF INKEY(63)=0 THEN GOSUB 250
180 IF INKEY(71)=0 THEN GOSUB 400
185 IF INKEY(47)=0 THEN GOSUB 450
186 IF x=b1 AND y+1=b2 AND pu=0 THEN pu=
    1:sc=sc+5:LOCATE x,y+1:PRINT" ":SOUN
    D 1,478,-1,0,1,0,2
190 LOCATE a,b:PAPER 0:PRINT"  "
192 IF pu=1 AND x=12 AND y=wal-1 THEN LO
    CATE 13,wal:PEN 3:PAPER 4:sc=sc+5:PR
    INT CHR$(135):SOUND 2,71,-1,15,2,1,1
    5:wal=wal-1:pu=0:PEN 5:PAPER 0:db=db
    +16:GOTO 125
```

MASTERFILE III

FOR THE AMSTRAD CPC 6128 (ALSO CPC 464/664 WITH DK 'TRONICS 64K RAM)



RATHER ENHANCED ...

We are pleased to announce the third major issue of MASTERFILE. This is no mere update, but a thoroughly enhanced and streamlined re-design of MASTERFILE 128, packed with new features, and a delight to use. We included some of the best ideas which our earlier MASTERFILE customers contributed. We sent prototypes out to our eager "test" users, and they kicked it as hard as they could, and came up with even more ideas. We spent several weeks further honing MASTERFILE III. Then we sat down and totally rewrote the manual.

SOMEWHAT POWERFUL ...

For the benefit of newcomers to the CPC machines, MASTERFILE III is a very powerful and flexible data filing and retrieval system. All "database" systems require that your data is organised into fields and records. But unlike most, MASTERFILE does not commit you to field lengths or formats, since ALL data is variable-length and optional. Files are not pre-formatted, and only used bytes are saved to disc. Also, unlike the rest, MASTERFILE allows multiple user-defined ways of viewing/printing your data. And unique in its price range, MASTERFILE offers RELATIONAL FILE options, whereby common data can be entered just once and shared by many records. Maximum field size is 240, maximum fields per record is over 50, and maximum file size is 64K. Room for 1,000 full names and addresses, for example. Only one disc drive is required. It is menu-driven throughout, and comes with detailed illustrated manual, and example files.

EVER SO FAST ...

Just about **Any** kind of information can be handled by MASTERFILE. You can **Export** the data to other systems (e.g. PROTEXT/MERGE and TASWORD). You can even merge your own USER BASIC to MASTERFILE for customised file processing. You can build new files from other sources — e.g. transfer data from Spectrum MASTERFILE. The speed of **Search** of MASTERFILE is second to none. We even get calls from customers who say that "The search did nothing"; they simply blinked and missed the revised status saying how many records had been found! Records can be sorted ascending/descending, character or signed numeric, even embedded keys such as surnames. We simply don't have room to list all the features; give us a call if you are still in doubt of the power of MASTERFILE III.

PLEASINGLY PRICED ...

How much does it cost? Just £39.95. Our test customers all say this is far too low — but then we didn't charge them this! However, we appreciate that many of you are "home" users who do not want to pay a "business" price. So we kept to a realistic figure. But don't be fooled by the low price. This is no toy written in **Basic**, nor is it a lumbering CP/M dinosaur. This is real machine-coded computing power. We have had IBM and Apricot users beg us for a MASTERFILE for their machines — when they had seen the earlier CPC MASTERFILE. They are going to be more frustrated now. So are the PCW plodders. Alas, many of you pay a lot more, because you buy one database after another before you throw them all out for MASTERFILE. The trick is to ask around, read the reviews and choose MASTERFILE III first time. Try telephoning our competitors and ask to speak to the programmer for technical information. Then try us. We think you will spot the difference!

For those of you who already have an earlier MASTERFILE, we tempt you with some of the extras that "III" has:

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```
200 GOTO 130
250 IF x>=20 THEN RETURN
251 LOCATE x+2,y:CALL &A000:IF CHR$(PEEK
    (&A007))<>" " THEN RETURN
260 x=x+1:RETURN
300 IF y=1 THEN RETURN
310 LOCATE x,y-1:CALL &A000:IF CHR$(PEEK
    (&A007))<>" " THEN RETURN
320 IF fs=0 THEN LOCATE x+1,y-1:CALL &A0
    00:IF CHR$(PEEK(&A007))<>" " THEN RE
    TURN
330 y=y-1:RETURN
350 IF y=20 THEN RETURN
360 LOCATE x,y+1:CALL &A000:IF CHR$(PEEK
    (&A007))<>" " THEN RETURN
370 IF fs=0 THEN LOCATE x+1,y+1:CALL &A0
    00:IF CHR$(PEEK(&A007))<>" " THEN RE
    TURN
380 y=y+1:RETURN
400 IF x<=1 THEN RETURN
401 LOCATE x-1,y:CALL &A000:IF CHR$(PEEK
    (&A007))<>" " THEN RETURN
410 x=x-1:RETURN
450 REM
455 LOCATE x,y+1:CALL &A000:a$=CHR$(PEEK
    (&A007))
460 PAPER 0:PEN 8:LOCATE x,y+1:PRINT a$:
    FOR f=26 TO 0 STEP -1:INK 8,f:SOUND
    1,930,4,4,0,0,4:FOR q=1 TO 11:NEXT q
    :NEXT f
470 LOCATE x,y+1:PRINT" ":PEN 1:RETURN
600 bonu=0:FOR f=wl TO db:bonu=bonu+1:NE
    XT f:GOSUB 7700:GOSUB 7800:sc=sc+bon
    u:FOR w=1 TO 3500:NEXT:BORDER 14:INK
    2,14:PAPER 0:PEN 2:PAPER 0:MODE 0
605 cr=0
607 WINDOW #1,1,20,21,25:INK 9,5:INK 10,
    23:PAPER #1,9:PEN #1,10:CLS#1
610 g=10:FOR f=20 TO 1 STEP-1:ud=-uod:FO
    R q=1 TO g-2:LOCATE f,q:INK 2,14:PAP
    ER 2:PRINT " ":NEXT q:LOCATE f,q:PAP
    ER 0:PEN 2:PRINT CHR$(132+ud)
620 FOR r=g+5 TO 20:PAPER 2:LOCATE f,r:P
    RINT" ":NEXT r:LOCATE f,g+4:PAPER 2:
    PEN 0:PRINT CHR$(132+ud):PAPER 0:PEN
    1:uod=INT(RND*3)-1:g=g+(uod AND g>1
    AND g<16):NEXT
625 PEN 1:PAPER 0
630 FOR f=1 TO 10:LOCATE 19,f:PRINT"  ":
    NEXT
640 INK 4,26:FOR f=1 TO 10:LOCATE 19,f:S
    OUND 1,478-(f*5),1,6:PEN 4:PRINT CHR
    $(129)CHR$(130):FOR q=1 TO 200:NEXT
    q:LOCATE 19,f:PRINT"  ":NEXT f
650 x=19:y=11
660 LOCATE x,y:PRINT CHR$(129)CHR$(130):
    a=x:b=y
665 IF cr=1 THEN INK 2,6,24:SPEED INK 2,
    2:FOR c=5 TO 15:SOUND 7,1000,2,7,0,0
    ,3:INK c,INT(RND*20):PEN c:PRINT CHR
    $(22)CHR$(1):LOCATE x,y:PRINT CHR$(I
    NT(RND*12)+173)CHR$(INT(RND*12)+173)
    :FOR wa=1 TO 50:NEXT wa:NEXT c:PRINT
    CHR$(22)CHR$(0):PEN 1:GOTO 9300
670 IF INKEY(9)=0 THEN y=y-1:GOTO 685
680 y=y+1
685 x=x-1:sc=sc+1:IF x=0 THEN GOTO 800
690 LOCATE x,y:CALL &A000:IF CHR$(PEEK(&
    A007))<>" " THEN cr=1
695 FOR q=1 TO 7:SOUND 1,800,1,7,0,0,10:
    SOUND 1,800,1,0,0,0,10:NEXT q
700 LOCATE a,b:PRINT"  "
710 GOTO 660
800 FOR d=1 TO 8:SOUND 4,106,-1,0,1,1,15
    :NEXT:CLS#1:LOCATE#1,6,1:PRINT#1,"WE
    LL DONE!":LOCATE #1,1,3:PRINT#1,"Pha
    se >2< Completed."
801 GOSUB 7700:bonu=50:GOSUB 7800:sc=sc+
    50:FOR w=1 TO 3500:NEXT w:PEN 1:INK
    0,26:INK 1,0:PAPER 0:BORDER 9:MODE 0
    :CLS
810 at=10:FOR f=15 TO 20:LOCATE 1,f:INK
    2,9:PAPER 2:PRINT"
     ":NEXT f
820 INK 3,14:INK 4,4:PEN 3:PAPER 4:FOR f
    =1 TO 5:LOCATE f,14:PRINT CHR$(146):
    NEXT f
825 INK 3,14:INK 4,4:PEN 3:PAPER 4:FOR f
    =14 TO 20:LOCATE f,14:PRINT CHR$(146
    ):NEXT f:PEN 1:PAPER 0
830 FOR f=10 TO 13:LOCATE 16,f:PAPER 1:P
    RINT"     ":NEXT f
835 LOCATE 15,9:INK 5,3:PAPER 5:PRINT"
     "
837 WINDOW #1,1,20,21,25:INK 9,5:INK 10,
    23:PAPER #1,9:PEN #1,10:CLS#1
840 PEN 1:PAPER 0
850 x=14:y=8:co=0
855 GOSUB 910:pe=INT(RND*5)+6
856 GOSUB 911
```

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```
860 LOCATE x,y:PRINT CHR$(129)CHR$(130):
    a=x:b=y
863 LOCATE pe,14:PRINT CHR$(142):pp=pe
865 IF INKEY(71)=0 THEN IF x>1 THEN x=x-
    1
870 IF INKEY(63)=0 THEN IF x<14 THEN x=x
    +1
880 IF INKEY(9)=0 THEN br=1:at=at-1:GOSU
    B 910:FOR f=9 TO 12:LOCATE x,f:PRINT
    CHR$(139):NEXT f:LOCATE x,13:PRINT
    CHR$(140):FOR f=1 TO 200:NEXT f:FOR
    f=9 TO 13:LOCATE x,f:PRINT" ":NEXT f
    :IF x=pe THEN GOSUB 920:IF co=5 THEN
    1000 ELSE GOTO 855
885 IF br=1 THEN br=0:GOSUB 911
890 pe=pe+INT(RND*3)-1:IF pe>13 THEN pe=
    13
891 IF pe<6 THEN pe=6
895 LOCATE pp,14:PRINT" ":LOCATE a,b:PRI
    NT"  "
900 GOTO 860
910 LOCATE #1,1,1:PRINT#1,"ATTEMPTS:"at"
    ":LOCATE #1,1,3:PRINT#1,"RESCUED :"
    co" ":RETURN
911 IF at=0 THEN 9300
912 RETURN
920 co=co+1:LOCATE pe,14:PRINT" ":sc=sc+
    20:RETURN
1000 GOSUB 7700:bonu=100:GOSUB 7800:sc=s
     c+100:SPEED INK 8,8:LOCATE #1,1,3:P
     EN #1,1:PAPER 0:PAPER#1,0:PRINT#1,"
     Phase >3< Completed.":LOCATE #1,6,1
     :PRINT#1,"WELL DONE!":FOR d=1 TO 8:
     SOUND 4,106,-1,0,1,1,15:NEXT
1005 FOR f=1 TO 3500:NEXT f
1010 CLS:INK 0,2:INK 1,26:BORDER 2:MODE
     1
1018 cv=2
1020 FOR f=1 TO 40:FOR q=1 TO cv:LOCATE
     f,q:PAPER 1:PRINT" ":GOSUB 1021:NEX
     T q:LOCATE f,q:PAPER 0:PRINT CHR$(1
     32):NEXT f:GOTO 1025
1021 cv=cv+INT(RND*3)-1:IF cv>3 THEN cv=
     3
1022 IF cv<1 THEN cv=1
1023 RETURN
1025 INK 2,14
1030 FOR f=1 TO 40:LOCATE f,20:PEN 0:PAP
     ER 1:PRINT CHR$(132):NEXT f:PEN 1:P
     APER 0
1035 WINDOW #1,1,40,21,25:PAPER #1,2:CLS
     #1
1040 rea=INT(RND*15)+3:LOCATE rea,19:PEN
     2:PRINT CHR$(137):PRINT CHR$(22)CH
     R$(1):LOCATE rea,19:PEN 3:PRINT CHR
     $(134):INK 3,0,26:PEN 3:LOCATE rea,
     19:PRINT CHR$(141):PRINT CHR$(22)CH
     R$(0):PEN 1
1050 x=39:bo=0
1060 LOCATE x,5:PEN 1:PRINT CHR$(129)CHR
     $(130):a=x
1065 IF INKEY(9)=0 AND bo=0 THEN bo=1:fa
     =6
1070 IF bo=1 THEN LOCATE x,fa:PRINT CHR$
     (136):SOUND 4,10+(fa*2),1,5
1075 SOUND 1,1500,1,5,0,0,10
1080 x=x-1:IF x=0 THEN 9300
1085 LOCATE a,5:PRINT"  ":IF bo=1 THEN L
     OCATE a,fa:PRINT" "
1090 IF bo=1 THEN fa=fa+1:IF fa=19 THEN
     1100
1095 GOTO 1060
1100 IF x=rea THEN INK 9,5:INK 10,23:PEN
     #1,9:PAPER#1,10:FOR d=1 TO 8:SOUND
     4,106,-1,0,1,1,15:NEXT:CLS#1:LOCATE
     #1,6,1:PRINT#1,"    W E L L   D O
     N E ! ":LOCATE #1,1,3:PRINT#1," P h
      a s e   > 4 <   C o m p l e t e d
     . ":GOTO 1200
1110 GOTO 9300
1200 GOSUB 7700:bonu=125:GOSUB 7800:sc=s
     c+bonu
1201 FOR f=1 TO 3500:NEXT f:MODE 0:INK 0
     ,0:INK 1,26:PEN 1:PAPER 0:CLS:WINDO
     W#1,1,20,21,25:INK 9,5:INK 10,23:IN
     K 11,5,23:PEN#1,9:PAPER#1,10:CLS#1:
     LOCATE#1,1,1:PRINT#1," AUTOMATIC LA
     NDING  ":LOCATE#1,1,3:PEN#1,11:PRIN
     T#1,"    E N G A G E D  ":SPEED INK
     25,25
1210 INK 2,7:PEN 2:FOR f=1 TO 20:LOCATE
     f,20:PRINT CHR$(146):NEXT f:PEN 1
1220 FOR f=13 TO 19:LOCATE 16,f:PRINT CH
     R$(143):LOCATE 19,f:PRINT CHR$(143)
     :NEXT f
1225 PEN 2:FOR f=15 TO 20:LOCATE f,12:PR
     INT CHR$(146):NEXT f
1230 INK 3,14:INK 4,20:PEN 4:PAPER 3:FOR
     f=8 TO 19:LOCATE 1,f:PRINT"
     ":NEXT f:PEN 1:PAPER 0
1235 LOCATE 7,19:PRINT" "
1240 FOR f=1 TO 10:PEN 2:LOCATE 17,f:PRI
     NT CHR$(129)CHR$(130)
1245 FOR q=1 TO 12:SOUND 1,50,1,4,0,0,2:
     SOUND 2,500,1,4,0,0,2:NEXT q
1247 LOCATE 17,f:PRINT"  "
1250 NEXT f
```

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```
1255 LOCATE 17,11:PRINT CHR$(129)CHR$(130)
1260 FOR f=1 TO 300:NEXT f:FOR f=13 TO 19:LOCATE 15,f:PAPER 1:PEN 1:PRINT" ":SOUND 4,100+(f*2),2,5:FOR q=1 TO 300:NEXT q:LOCATE 15,f:PEN 1:PAPER 0:PRINT" ":NEXT f
1265 FOR f=15 TO 8 STEP -1:LOCATE f,19:INK 5,11:PEN 5:PRINT CHR$(144):FOR q=1 TO 250:NEXT q:LOCATE f,19:PRINT " ":NEXT f:LOCATE 7,19:PRINT CHR$(144):PEN 1
1270 GOTO 1300
1300 fs=1:FOR f=1 TO 3500:NEXT f
1301 pu=0
1305 BORDER 3:INK 0,3:INK 1,26:PEN 1:PAPER 0:CLS:MODE 0
1307 WINDOW#1,1,20,21,25:INK 9,5:INK 10,23:PEN #1,9:PAPER #1,10:CLS#1
1310 INK 2,15:INK 3,5
1315 PEN 2:PAPER 3:FOR f=15 TO 20:FOR q=1 TO 6:LOCATE q,f:PRINT CHR$(135):NEXT q:FOR q=15 TO 20:LOCATE q,f:PRINT CHR$(135):NEXT q:NEXT f:PEN 1:PAPER 0
1320 FOR f=2 TO 10 STEP 2:FOR q=1 TO 20:LOCATE q,f:INK 4,14:PEN 4:PAPER 0:PRINT CHR$(132):NEXT q:FOR o=1 TO 2:PEN 1:LOCATE INT(RND*18)+2,f:PRINT" ":NEXT o:NEXT f
1321 INK 6,2:FOR f=1 TO 10:PEN 4:PAPER 6:LOCATE 1,f:PRINT CHR$(143):LOCATE 20,f:PRINT CHR$(143):NEXT f
1330 PEN 5:PAPER 0:INK 5,26:LOCATE 7,15:PRINT CHR$(146)
1337 mo=1
1340 br=8:x=20:y=14
1345 xc=INT(RND*18)+2:yc=INT((RND*5)+1)*2:LOCATE x,y:CALL &A000:IF PEEK(&A007)=132 THEN GOTO 1345
1346 LOCATE xc,yc:PEN 5:PAPER 0:PRINT CHR$(146)
1350 LOCATE x,y:PEN 4:PRINT CHR$(144):PEN 1:a=x:b=y
1351 LOCATE mo,14:INK 7,20:PEN 7:PRINT CHR$(145):mox=mo
1352 IF INKEY(9)=0 THEN GOSUB 300:GOTO 1355
1353 GOSUB 350
1354 mo=mo+(1/12)
1355 IF INKEY(63)=0 THEN x=x-1:GOSUB 250:x=x+1
1360 IF INKEY(71)=0 THEN GOSUB 400
1365 LOCATE a,b:PEN 1:PAPER 0:PRINT" "
1366 LOCATE mox,14:PEN 1:PRINT" "
1370 IF pu=0 AND x=xc AND y=yc-1 THEN pu=1:LOCATE xc,yc:PRINT" ":sc=sc+5
1371 IF br=15 THEN CLS#1:LOCATE#1,6,1:PRINT#1,"WELL DONE!":LOCATE #1,1,3:PRINT#1,"Phase >5< Completed.":GOSUB 7700:bonu=(15-INT(mo))*5:GOSUB 7800:sc=sc+bonu:FOR d=1 TO 8:SOUND 4,106,-1,0,1,1,15:NEXT:FOR f=1 TO 3500:NEXT f:GOTO 4000
1372 IF INT(mo)=br THEN FOR f=15 TO 20:LOCATE br,f:PRINT CHR$(144):SOUND 1,f*3,1,7:FOR d=1 TO 5:NEXT d:LOCATE br,f:PRINT" ":NEXT f:GOTO 9300
1375 IF pu=1 AND x=br AND y=14 THEN LOCATE br,15:PEN 5:PAPER 0:PRINT CHR$(146):pu=0:br=br+1:sc=sc+5:GOTO 1345
1380 GOTO 1350
3500 bonu=500:GOSUB 7800:FOR f=1 TO 3500:NEXT f:GOTO 8
4000 MODE 0:INK 0,26:BORDER 26:INK 1,0:PEN 1:PAPER 0:CLS
4005 WINDOW#1,1,20,21,25:INK 9,5:INK 10,23:PEN#1,9:PAPER #1,10:CLS#1
4010 be=10:INK 2,2:INK 3,9,19:SPEED INK 32,32:FOR f=1 TO 4:LOCATE 1,f:PEN 2:PAPER 3:PRINT STRING$(20,143):PEN 1:PAPER 0:LOCATE 10,f:PRINT"  ":NEXT f
4020 FOR f=4 TO 19
4021 be=be+INT(RND*3)-1:IF be=20 THEN be=19 ELSE IF be=0 THEN be=1
4022 LOCATE 1,f:PEN 2:PAPER 3:PRINT STRING$(20,143):PEN 1:PAPER 0:LOCATE be,f:PRINT"  ":NEXT f
4030 PEN 4:PAPER 5:INK 4,15:INK 5,0:LOCATE 1,20:PRINT STRING$(20,146)
4040 FOR f=be TO 20:LOCATE f,19:PEN 1:PAPER 0:PRINT" ":NEXT f
4045 x=10:y=1
4050 INK 9,14:LOCATE x,y:PEN 9:PRINT CHR$(144):a=x:b=y
4051 sc=sc+1
4055 IF INKEY(63)=0 THEN x=x+1
4060 IF INKEY(71)=0 THEN x=x-1
4070 SOUND 1,478+(y*3),4,5:FOR f=1 TO 105:NEXT f
4072 y=y+1:IF y=20 THEN CLS#1:LOCATE#1,6,1:PRINT#1,"WELL DONE!":LOCATE #1,1,3:PRINT#1,"Phase >6< Completed.":GOSUB 7700:FOR d=1 TO 8:SOUND 4,106,-1,0,1,1,15:NEXT:FOR f=1 TO 3500:NEXT f:GOTO 5000
4075 LOCATE a,b:PRINT" "
4077 LOCATE x,y:CALL &A000:IF CHR$(PEEK(&A007))<>" " THEN 9300
4080 GOTO 4050
5000 INK 0,0:INK 1,26:PEN 1:PAPER 0:MODE 0:CLS:BORDER 1
5010 INK 2,26:INK 3,2:PEN 2:PAPER 3:LOCATE 1,20:PRINT STRING$(20,146):PEN 1:PAPER 0
5020 INK 4,2:INK 5,8:PEN 4:PAPER 5:FOR f=4 TO 20 STEP 4:FOR q=14 TO 19:LOCATE f,q:PRINT CHR$(143):NEXT q:NEXT f
5030 PEN 2:PAPER 3:LOCATE 4,13:PRINT STRING$(17,146)
5040 INK 6,6:PEN 6:PAPER 0:LOCATE 4,12:PRINT CHR$(147)CHR$(148)
5045 INK 7,23:PEN 1:PAPER 7:LOCATE 3,19:PRINT " ":PEN 1:PAPER 0
5050 FOR f=1 TO 2:LOCATE f,19:INK 8,14:PEN 8:PAPER 0:PRINT CHR$(144):SOUND 1,233,-1,15,3,1:FOR q=1 TO 420:NEXT q:LOCATE f,19:PRINT" ":NEXT f
5055 FOR f=19 TO 12 STEP -1:PAPER 7:LOCATE 3,f:PRINT" ":SOUND 2,99+(f*5),-1,15,1:FOR q=1 TO 420:NEXT q:LOCATE 3,f:PAPER 0:PRINT" ":NEXT f:PAPER 7:LOCATE 3,13:PRINT" ":PAPER 0
5060 qq=12:z=1000:FOR f=4 TO 19:LOCATE f,qq:PEN 6:PRINT CHR$(147)CHR$(148):FOR q=1 TO 100:SOUND 1,z,1,15,0,1,1:z=z-0.25:NEXT q:LOCATE f,qq:PRINT"  ":qq=qq-(1/3):NEXT f
5065 GOTO 6000
6000 MODE 1:INK 0,0:BORDER 1:INK 1,26:PEN 1:PAPER 0:CLS
6010 INK 2,9:INK 3,18:FOR f=15 TO 20:FOR q=1 TO 40 STEP 2:PAPER INT(RND*2)+2:PEN 0:LOCATE q,f:PRINT"  ":NEXT q:NEXT f
6020 LOCATE 1,14:INK 4,17:PEN 4:PAPER 1:PRINT STRING$(40,146)
6030 FOR f=15 TO 20:LOCATE 16,f:PEN 1:PAPER 0:PRINT"                        ":NEXT f
6040 LOCATE INT(RND*20)+15,14:PRINT"  "
6050 x=1
6060 LOCATE x,1:PEN 1:PRINT CHR$(147)CHR$(148):a=x
6061 SOUND 1,3000,1,7,0,0,15
6065 IF INKEY(9)=0 THEN GOTO 6080
6070 LOCATE a,1:PRINT"  "
6074 x=x+1:IF x=40 THEN STOP
6075 GOTO 6060
6080 FOR f=1 TO 13:LOCATE x,f:PRINT CHR$(147)CHR$(148):SOUND 2,223,10,15,2,1,1:FOR q=1 TO 200:NEXT q:LOCATE x,
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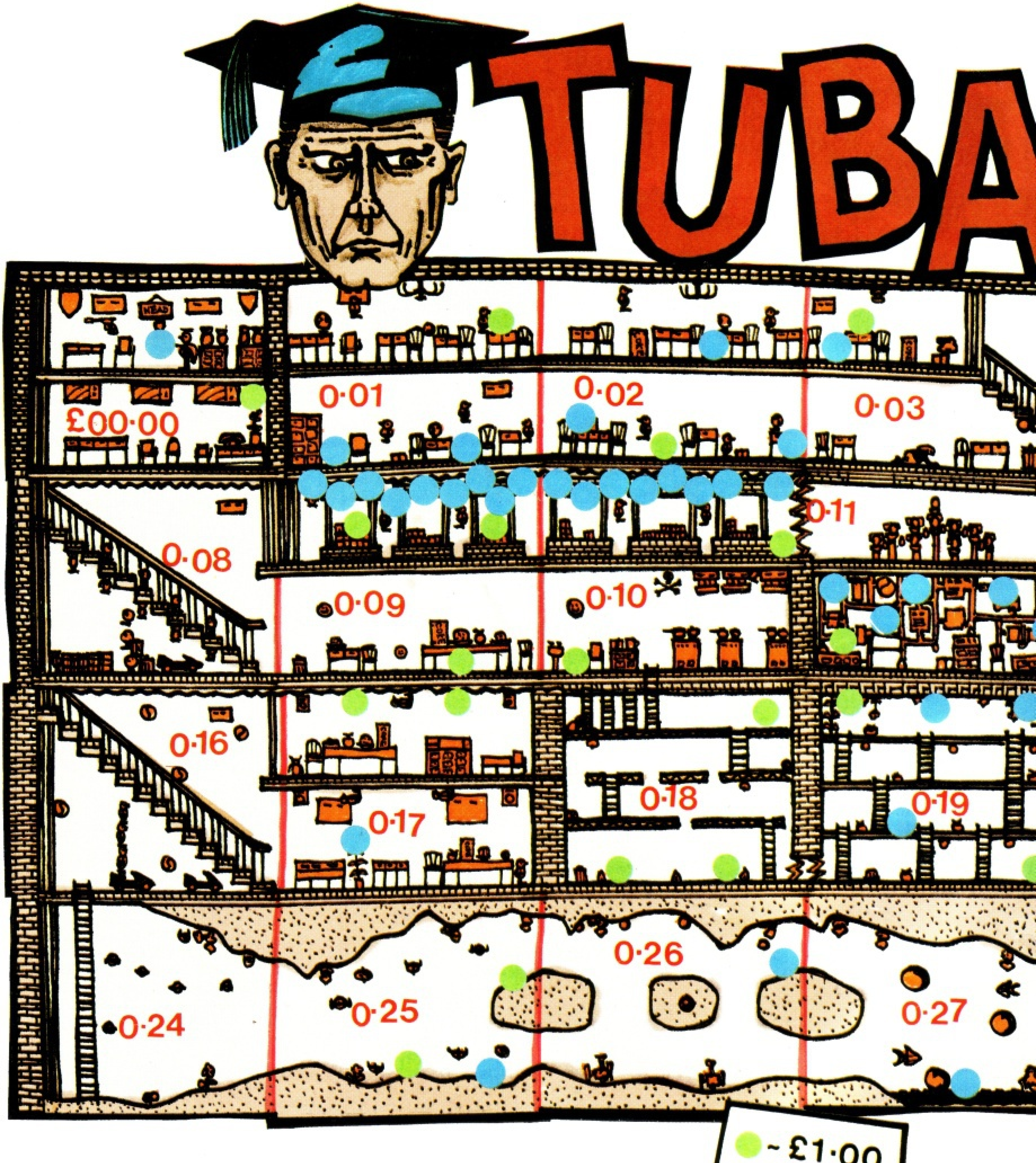
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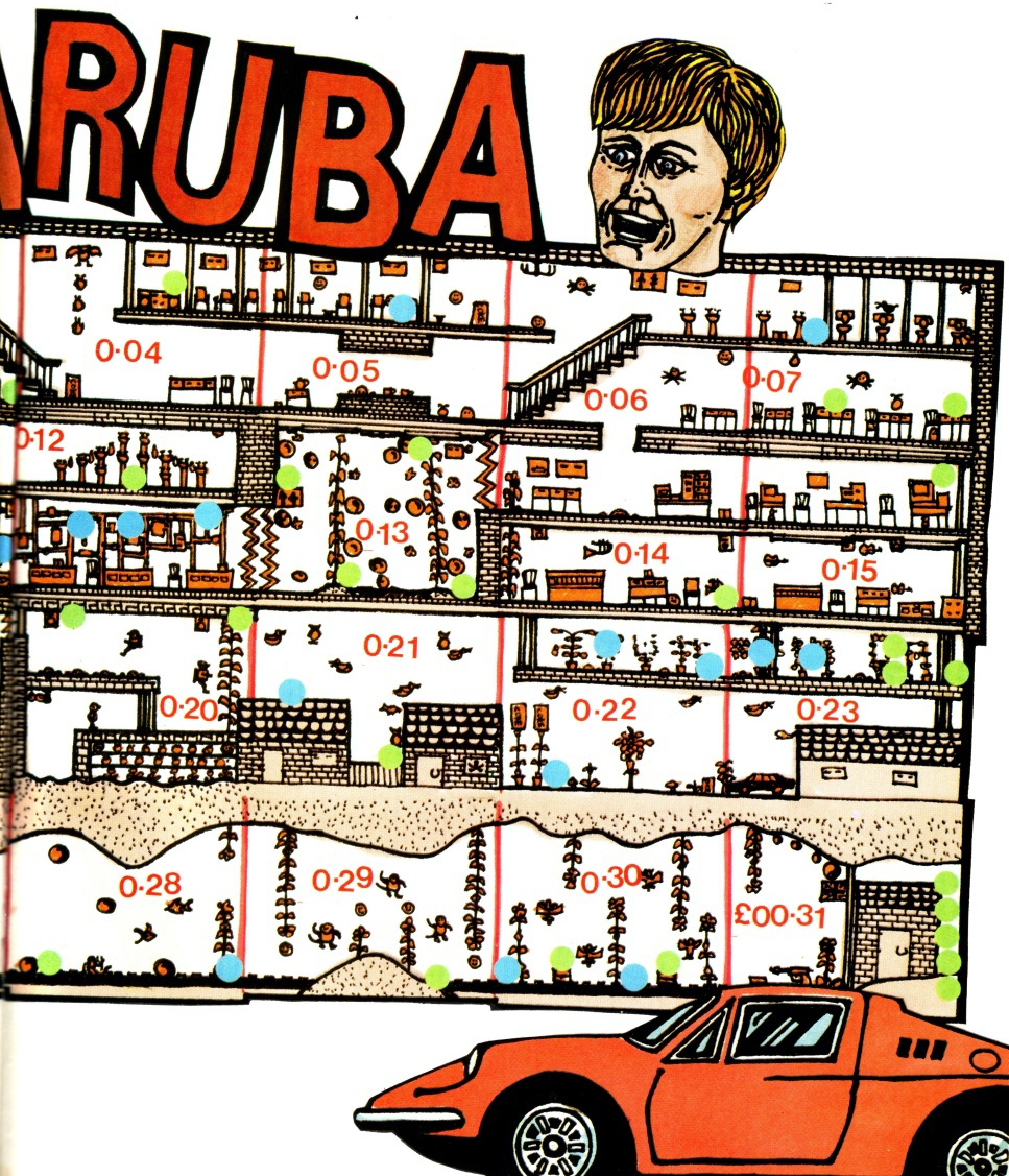
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     f:PRINT"   ":NEXT f
6085 LOCATE x,14:CALL &A000:IF CHR$(PEEK
     (&A007))<>" " THEN 9300
6090 LOCATE x+1,14:CALL &A000:IF CHR$(PE
     EK(&A007))<>" " THEN STOP
6095 GOTO 7000
7000 WINDOW #1,1,40,21,25:PEN#1,9:PAPER
     #1,10:INK 9,5:INK 10,23:CLS#1:LOCAT
     E#1,16,1:PRINT#1,"WELL DONE!":LOCAT
     E #1,11,3:PRINT#1,"Phase >7< Comple
     ted.":GOSUB 7700:bonu=200:GOSUB 780
     0:FOR d=1 TO 8:SOUND 4,106,-1,0,1,1
     ,15:NEXT:FOR f=1 TO 3500:NEXT f
7010 MODE 1:INK 0,20:INK 1,0:PEN 1:PAPER
     0:CLS
7020 PAPER 2:INK 2,15:FOR f=18 TO 20:LOC
     ATE 1,f:PRINT SPACE$(40):NEXT f:PAP
     ER 0
7030 pl=INT(RND*20)+19:LOCATE pl,18:PEN
     3:INK 3,3:PAPER 2:PRINT CHR$(146)CH
     R$(146):PAPER 0:PEN 1
7040 LOCATE 1,3:PEN 1:PAPER 2:PRINT CHR$
     (135)CHR$(135):PEN 1:PAPER 0
7050 x=1:y=2:dd=0
7055 LOCATE x,y:PEN 1:PAPER 0:PRINT CHR$
     (147)CHR$(148)
7060 IF INKEY(9)<>0 THEN 7060
7065 LOCATE x,y:PRINT CHR$(147)CHR$(148)
7070 a=x:b=y:x=x+1:IF x=40 THEN STOP
7075 IF dd=0 AND INKEY(9)<>0 THEN dd=1
7080 IF dd=1 THEN y=y+1:IF y=18 THEN 710
     0
7085 LOCATE a,b:PRINT"  "
7090 GOTO 7065
7100 IF x=pl+1 THEN WINDOW #1,1,40,21,25
     :PEN#1,9:PAPER#1,10:INK 9,0,26:SPEE
     D INK 20,20:INK 10,23:CLS#1:LOCATE#
     1,10,2:PRINT#1,"FINAL PHASE COMPLET
     ED.":FOR d=0 TO 26:INK 0,d:SOUND 4,
     106,-1,15,1,1,15:NEXT:FOR f=1 TO 35
     00:NEXT f:GOTO 3500
7110 GOTO 9300
7500 MODE 0:INK 0,0:INK 1,26:BORDER 0:PE
     N 1:PAPER 0:CLS
7510 i=2:FOR f=3 TO 18:LOCATE f,1:PEN i:
     PRINT CHR$(138):GOSUB 7900:NEXT f
7520 FOR f=2 TO 25:LOCATE 18,f:PEN i:PRI
     NT CHR$(138):GOSUB 7900:NEXT f
7525 FOR f=17 TO 3 STEP -1:LOCATE f,25:P
     EN i:PRINT CHR$(138):GOSUB 7900:NEX
     T f
7530 FOR f=24 TO 2 STEP -1:LOCATE 3,f:PE
     N i:PRINT CHR$(138):GOSUB 7900:NEXT
     f
7534 DATA 2,6,9,12,13,15,20
7540 GOSUB 7600
7542 FOR tl=1 TO 125
7545 FOR f=2 TO 8:INK f,co(cc(f-1)):NEXT
     f
7550 FOR f=1 TO 7:cc(f)=cc(f)+1:IF cc(f)
     =8 THEN cc(f)=1
7555 NEXT f
7556 GOSUB 9420
7560 NEXT tl:GOTO 9350
7600 INK 14,26:PEN 14:FOR f=1 TO 20:LOCA
     TE 5,f+3:PRINT hs$(f):LOCATE 12,f+3
     :PRINT hs(f):NEXT f:RETURN
7700 PEN 0:PAPER 1:LOCATE 1,1:PRINT"
         ":LOCATE 1,2:PEN 15:INK 15,0
     ,26:SPEED INK 30,30:PRINT"Score
       ":LOCATE 1,3:PRINT"          ":L
     OCATE 6,2:PRINT sc:RETURN:PEN 1
7800 LOCATE 1,5:PEN 0:PAPER 1:PRINT"
         ":PEN 15:LOCATE 1,6:PRINT"Bo
     nus       ":LOCATE 1,7:PRINT"
         ":LOCATE 7,6:PRINT bonu:PEN 1:R
     ETURN
7900 i=i+1:IF i=9 THEN i=2
7901 RETURN
8500 MODE 1:INK 1,1:BORDER 1:INK 0,26:PE
     N 1:PAPER 0:CLS
8510 LOCATE 13,13:PRINT"You scored"sc
8520 FOR f=1 TO 20:IF sc>hs(f) THEN GOTO
      8530
8525 NEXT f:FOR f=1 TO 3500:NEXT f:GOTO
      9350
8530 FOR z=19 TO f STEP -1:hs(z+1)=hs(z)
     :hs$(z+1)=hs$(z):NEXT z:hs(f)=sc
8535 LOCATE 1,15:PRINT" You have one of
     todays high scores!!!!  Please ente
     r your name:"
8539 FOR q=1 TO 100:i$=INKEY$:NEXT q
8540 LOCATE 1,18:INPUT n$:IF LEN (n$)>5
     THEN GOTO 8540
8545 IF n$="" THEN n$="ANON"
8546 hs$(f)=n$
8550 FOR f=1 TO 3500:NEXT f:GOTO 7500
9000 RESTORE 9010:FOR f=0 TO 6:READ a$:P
     OKE &A000+f,VAL("&"+a$):NEXT:RETURN
9010 DATA cd,60,bb,32,07,a0,c9
9200 SYMBOL AFTER 129
9210 RESTORE 9220:FOR q=0 TO 19:READ a,b
     ,c,d,e,f,g,h:SYMBOL 129+q,a,b,c,d,e
     ,f,g,h:NEXT q:RETURN
9220 DATA 170,8,62,79,127,63,146,127,130
     ,13,14,251,244,192,0,128,255,254,25
     0,248,248,240,208,128,255,158,12,8,
     8,0,0,0,255,127,95,31,31,15,11,1,0,
     0,36,0,36,0,0,0,254,254,254,0,191,1
     91,191,0,126,24,44,94,191,191,223,1
     26,60,126,255,126,255,126,255,255
9230 DATA 60,102,223,191,191,255,126,60,
     28,56,28,56,28,56,24,12,6,6,6
     ,70,126,0,0,0,129,0,129,0,0,0,0,0,0
     ,24,36,36,24,189,171,213,171,213,17
     1,213,171,213,60,36,24,126,24,60,36
     ,102,24,36,36,24,189,126,36,102,170
     ,255,255,136,85,34,85,136
9240 DATA 12,240,14,129,255,255,255,255,
     0,0,0,192,248,255,255,255
9300 FOR f=1 TO 26:LOCATE 1,25:PRINT"
     ":NEXT
9310 SPEED INK 40,20:MODE 0:INK 2,26,0:P
     EN 2:wo$="GAME OVER":FOR f=0 TO 8:L
     OCATE 2+(f*2),13:PRINT MID$(wo$,f+1
     ,1):SOUND 1,200,10,15,2,1,5:FOR q=1
      TO 100:NEXT q:NEXT f
9315 PEN 1:FOR q=1 TO 3500:NEXT q
9320 GOTO 8500
9350 MODE 1:PEN 1:PAPER 0:INK 2,14:INK 3
     ,20:BORDER 14:CLS
9355 FOR f=1 TO 25:PAPER 2:LOCATE 1,f:PR
     INT STRING$(40,135):NEXT f
9360 PEN 3:PAPER 0:LOCATE 10,2:PRINT"
                    ":LOCATE 10,3:PRIN
     T" DESTINATION SATURN ":LOCATE 10,4
     :PRINT"                    "
9365 LOCATE 9,22:PRINT" Written By Brian
      Round "
9370 PEN 1:FOR f=1 TO 40:LOCATE f,12:PRI
     NT CHR$(143):LOCATE f,13:PRINT" ":L
     OCATE f,14:PRINT CHR$(143):NEXT f
9375 wr$="
                  You are Ivan Beurk,sen
     t to saturn to rescue the saturnian
     s,blow up the reactor which is caus
     ing all the trouble and rebuild the
     ir stricken world.
                                       "
9385 DATA 716,0,716,758,851,956,956,851,
     758,716,568,638,0,716,638,426,0,426
     ,478,478,0,0,0,536,0,536,568,568,0,
     0,0,358,358,379,0,379,426,478,478,4
     78,478,536,536,478,0,426,478,536,56
     8,638,716,0,716,0,0,0,0,0,0,0,255
9390 INK 0,26:INK 1,0:RESTORE 9385:FOR f
     =1 TO 198:LOCATE 1,13:PRINT MID$(wr
     $,f,40):READ a:IF a=255 THEN RESTOR
     E 9385:READ a
9395 SOUND 1,a,20,15,2:SOUND 2,a+2,20,15
     ,2:GOSUB 9420:NEXT f
9400 wr$="                 Use the keys
       Z-Left , X-Right , COPY-Up and <
     SPACE BAR>-Bomb(first screen only.)
                   P-Play.
            ***************GOOD LUCK***
     *************"
9405 FOR f=1 TO 142:LOCATE 1,13:PRINT MI
     D$(wr$,f,40):READ a:IF a=255 THEN R
     ESTORE 9385:READ a
9410 SOUND 1,a,20,15,2:SOUND 2,a+4,20,15
     ,2:GOSUB 9420:NEXT f
9415 GOTO 7500
9420 INK 3,INT(RND*14):IF INKEY(27)=0 TH
     EN sc=0:GOTO 8 ELSE RETURN
```





MAPPED BY JOHN ALEXANDER


ARUBA
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GALLUP SOFTWARE POLL

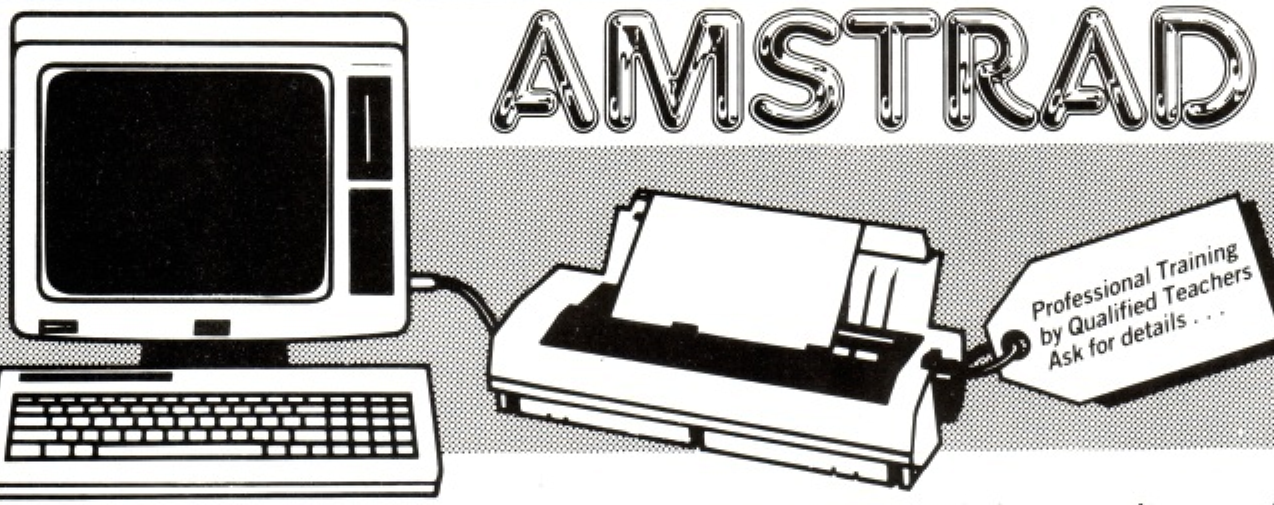
		Last month	Months in chart		Market strength
1	**Kane** *Mastertronic*	1	2	Three part shoot-em-up set in the Wild West. Excellent animation with lots to do at a bargain price.	100
2	**Harvey Headbanger** *Firebird*	16	2	Jolly arcade game which demands quick wits and fast responses. Best as a two-player game.	78
3	**Ghosts and Goblins** *Elite*	ne	1	Faithful conversion of the coin-op original. Difficult but addictive. Great fun once mastered.	75
4	**Molecule Man** *Mastertronic*	ne	1	Budget priced 3D maze game. Ideal for mapping fans with a room designer. High quality graphics and very playable.	65
5	**Green Beret** *Imagine*	2	2	Blood and thunder coin-op convert. Take on a whole army with only a knife and the occasional flame thrower.	63
6	**Elite** *Firebird*	5	3	The famous space trading game with plenty of mid-flight action. Highly addictive an essential purchase.	60
7	**Storm** *Mastertronic*	ne	1	Gauntlet style view from above arcade game. Very addictive with a huge map.	59
8	**Knight Tyme** *Mastertronic*	ne	1	Cute combination of adventure and arcade. Pop down menus and clever puzzles make this a very different game.	58
9	**Speed King** *Mastertronic*	ne	1	Fast, high-speed action. Budget priced and certainly worth looking at.	45

10	**Thrust** *Firebird*	ne	1	Simple and clever space game. A cross between asteroids and lunar lander. The best buy yet from Firebird.	44
11	**Kung Fu Master** *US Gold*	11	2	Rescue your girlfriend by beating up a variety of foes as you take a lift from floor to floor, fighting your way on each.	38
12	**Radzone** *Mastertronic*	6	2	Simple 2D sprite based game with loads of locations. Very pretty graphics.	38
13	**Star Firebirds** *Firebird*	ne	1	Conversion from the ancient coin-op. A standard left-right-fire Shoot-'em-up in space.	37
14	**Jack the Nipper** *Gremlin Graphics*	ne	1	Run around the town and be as naughty as possible. Polished graphics and a wicked sense of humour.	37
15	**Batman** *Ocean*	4	3	Proof that the 3D maze game can still feel fresh. 150 brilliant room designs and excellent graphics.	32
16	**Winter Games** *Epyx/US Gold*	3	3	Either late for last winter or early for next a chance to practice all those Olympic events you see on the telly.	28
17	**Knight Games** *English*	ne	1	Middle ages combat game. Bash the hell out of a friend while wearing armour.	28
18	**They Sold (2)** *Hit Squad*	7	4	They have sold a million and just keep going. Old games never die they just get compiled.	25
19	**Tomahawk** *Digital Integration*	8	3	Helicopter flight simulation which is both accurate and fun. Plenty of things to shoot with strategy if you want it.	24
20	**Formula One Sim.** *Mastertronic*	9	10	Grand Prix thrills and spills. Old man of the chart this has been a long time favourite.	24

Non-mover Up Down New entry

October 1986

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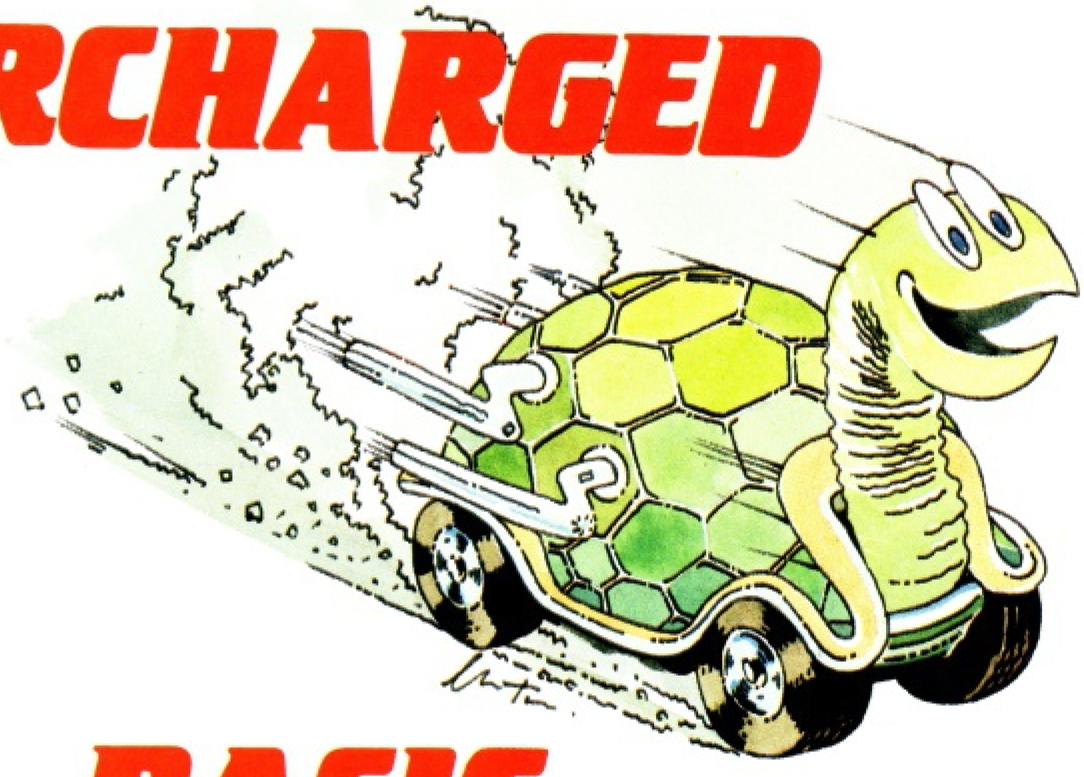
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SUPERCHARGED BASIC



Compilers turn Basic into machine code, they could be a programmer's dream come true. Cliff Lawson looks at the two currently available for the Amstrad to see if they work.

Question: What is a compiler? Answer: While the Locomotive Basic supplied with Amstrad CPC computers is generally recognised as being one of the fastest available it is a sad fact that the very nature of the way that a Basic interpreter operates means that a lot of the processing power of the machine is lost to the programmer.

Take the following very simple program.

```
20 fred=30
```

When RUN, "all" this program does is make the variable fred equal to 37. This is all pretty straightforward stuff, but just consider for a second exactly what happens once the word RUN has been typed.

First of all Basic realises that the word RUN means go to the area of memory where the program is held, get the first character and see if it makes any sense.

First it comes to the letter f of fred in line 20. So far so good. This could be the starting letter of a command (FIX, FOR, FRE) or it might be the start of a variable name. Only time will tell.

A look at the next character, r, rules out FIX and FOR but FRE is still a possibility. Only once it gets to the d is it obvious that this can only be a variable name. But of course the line might just say "10 fred" which is a SYNTAX ERROR so it looks on until it reaches the = sign which confirms that it is indeed a variable assignment. If it now came upon a quotation mark ", then that would cause a TYPE MISMATCH error, but in this case it's OK.

Now it has to consider exactly what = means. What it really means is reserve a bit of memory somewhere and give it the name fred and put the value 37 into it.

Just deciding that the characters 3 and 7 together make the decimal value 37 is quite a feat in itself. There are many other things that Basic will take into account before that seemingly simple instruction has completed execution.

All in all, this process will have executed several hundred machine code instructions in the process of deciding just what has to be done, if there might actually be an error and finally where it can put this variable information and so on.

No great hardship, you may say. Perhaps you don't really mind if it has to think about it for a little while. But consider a couple of points. Firstly, a programmer writing directly in machine code would have accomplished the same task as follows :

```
      LD    HL,37
      LD    (fred),HL
      RET
fred: DEFW  0
```

That is only three instructions compared to the hundreds that Basic will have taken. Consider also the situation if the line were actually part of a larger program:

```
10 FOR i=1 TO 10000
20 fred=37
30 NEXT i
```

Leaving aside the consideration of exactly what lines 10 and 30 mean, Basic will have to go through the same process outlined above 10,000 times for each time it comes to line 20. Those few hundred instructions have just become several million. If the assembler programmer had the same task he would achieve it with:

```
      LD    BD,10000
      LD    HL,37
loop: LD    (fred),HL
      DEC   BC
      LD    A,B
      OR    C
      JR    NZ,loop
      RET
fred: DEFB  0
```

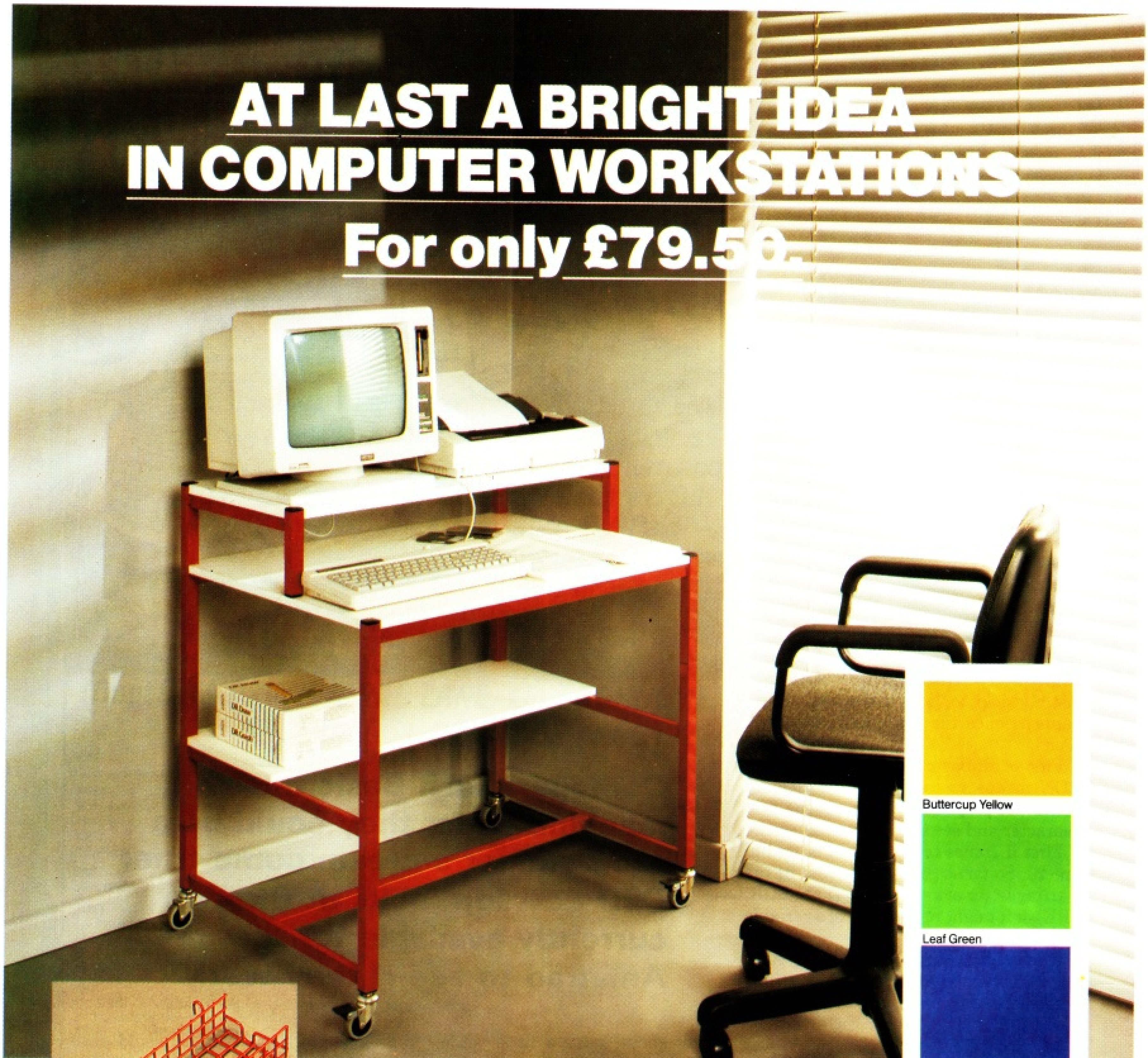
True, there are five instructions in the loop that will execute 10,000 times, but this is far fewer than the millions that Basic will have taken. Besides which, four of the five are involved in looping 10,000 times. It is only really the 'LD (fred),HL' that is analogous to the 'fred=37'.

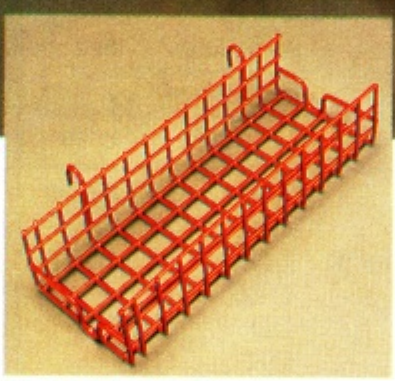
That single assignment line in the machine code version executes 10,000 times in 16 300ths of a second while the single line of Basic (using integer variables) takes 1,830 300ths, which is about 114.4 times as long.

The major drawback of using machine

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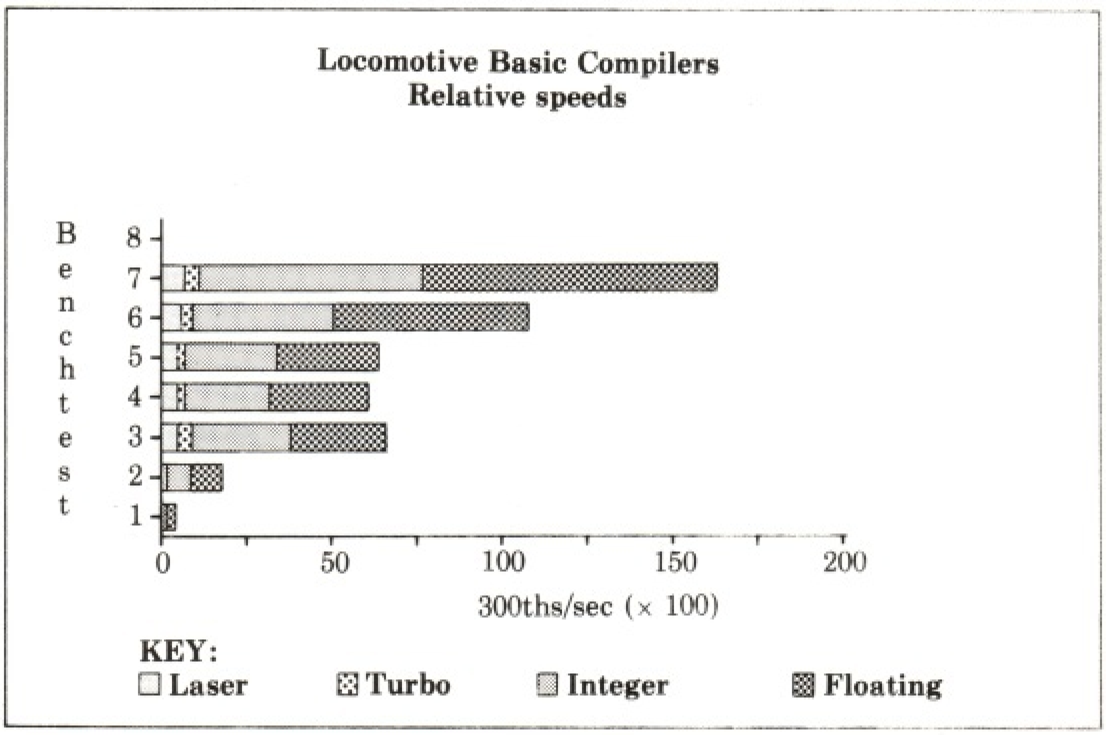
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code is its complexity. The simple example above demonstrates how much more complicated machine code is . Just try doing something like 'fred=37 *45=53/19' in machine code and the headaches will really start!

Wouldn't it be nice if you could write a program in the simple Basic we all know and love (?), then turn this into its machine code equivalent so that parts of the program that occur within a loop (usually most of it) can be converted into their machine code equivalents once and for all instead of requiring conversion every time the loop executes.

Such a thing exists. It is known as a compiler, because it compiles a machine code equivalent of the Basic original. The name usually used for the original program is the Source, while the machine code that is produced at the end of the day is called the Object.



Why not compile all the time?

Before going on to describe two particular compilers for Amstrad Basic you may well be sitting there saying: "If compilers really are the greatest thing since the white slice, why does everyone supply Basic as an interpreter?".

Well, truth to tell, there is a bit of a drawback to using compilers. Consider, for example, that we wanted to change the example program so it loops 20,000 times, instead of 10,000. Using normal interpreted Basic you would just type a new line 10 FOR i=1 to 20000, then RUN and the effect of the change could be seen instantly.

If we were using a compiler, first the source program would be loaded, the change made, and then the source would be saved out again. Next the compiler would be loaded and run. This would read in the source, compile it and write out the object. Finally the new version of the object could be run to see the effect of the change.

That's an awful lot more to do before you can see the effect of the change. In our example, three lines would be compiled almost instantly, but if the program had been a decent length the compiling process might take a couple of minutes.

If you have to wait several minutes to see the effect of a change to your program every time one is made it can become more than a little tedious. It does, however, help you to be much more methodical in designing the program in the first place, as the fewer times you have to change it from your original "flowchart" design the better.

Interpreted languages tend to encourage a much more "suck it and see" attitude to programming. More "serious" languages that are used in the business environment (Pascal, Fortran, Cobol,and so on) are almost exclusively supplied in the form of a compiler as the speed of operation of the final program is the most important consideration.

Lucky purchasers of the new Amstrad PC1512 will be able to benefit from the best of both worlds. Locomotive Basic 2 is an interpreter that is so efficient that it runs programs at speeds comparable to compiled Basic programs. See the benchmark timings – though do bear in mind that part of the speed increase is a result of the different hardware.

Ocean v HiSoft

The two compilers now available to handle CPC Basic are Hisoft's TurboBasic and Ocean IQ's Laser Compiler. You'll remember that single Basic instruction fred-37 that took 16/300 sec for its machine code equivalent to execute while the original Basic took 1830/300 sec.

Well, using TurboBasic it took 133/300 sec (13.8 times as fast as interpreted Basic) and with Laser compiled Basic it took 27/300 sec (67.8 times as fast as normal). Don't go thinking that you will always expect to get a speed increase of this order. The standard benchmarks show that the average speed increase for TurboBasic is 11.03 times while Laser Compiler clocks in at 7.87.

The area in which there is the most marked speed increase is for loops and logical operations – IF . . . THENs and so on. Some operations are not particularly affected, for example most of the computing time involved in a statement such as DRAW 200,200 is taken by the firmware routine that draws lines. When compiled this is the selfsame routine that is used, so that the speed increase is not particularly noticeable.

The Laser Compiler is always RUN from disc or tape in order to compile a program that is held on disc,,while the Hisoft TurboBasic adds three RSXs that can be used to compile the Basic program currently held in memory (using MAKE). It can also be used in a similar way to the Laser Compiler with the command COMPILE which will read the program from disc and then either write the object out to another file, like the Laser Compiler, or put it in memory.

The third RSX, RUN, is used to run a TurboBasic compiled program that is currently in memory, as the result of either MAKE or COMPILE.

As mentioned earlier, a major drawback of compilers is the time it takes to compile the program. In this area the Hisoft offering is by far the better. Firstly, if the Basic program is not too large then the compiler remains in memory above the Basic. This means that each time a change is made there is no delay in saving the Basic and reloading the compiler.

If the program gets to such a size that it cannot fit alongside the compiler the alternative method can be used.

The Laser Compiler always uses the method where the program must first be saved. Also the Hisoft compiler takes tokenised Basic as input, while the Laser Compiler uses saved Ascii which takes a noticeably longer time to save and load.

An example program that took 47.8 seconds after the last change before seeing the result using TurboBasic took 85.2 seconds using the Laser Compiler.

A second point to consider when comparing compilers is how fast the object code executes compared to the normal Basic equivalent. Table I shows the length of time taken and consequent increase in speed when running each of the standard benchmark programs. Just for interest's sake the figures for Basic 2

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on the PC1512 are also included.

Benchmarks are a notoriously bad indication of a machine's speed. It is far more instructive to compare timings for a serious application. Now I don't think anyone could call the Sieve of Eratosthenes a serious application, but it is a bit of a classic – in fact both compilers have a listing of it in their manuals. The figures for the one from the Hisoft manual are also shown in Table I.

Something I haven't mentioned so far is that both of the compilers are a bit of a cop-out when it comes to floating point numbers. They both work solely with integers, which means you can have numbers like 37, 12345, 19, 263 but 3.1415927, 123456789, 0.002, 37.19 go out of the window.

Also, consider a useful function like SIN – very useful for doing things like drawing circles. This always returns a value between 0 and 1, so since integers will only allow 0 and 1 but nothing in between there ain't a great deal of point in it and consequently all the trig functions are not implemented. In fact the only permissible numbers are whole numbers (0,1,2,3,4,...) between –32767 and +32767.

As well as the loss of the floating point functions, several others are modified. This means that all but the very simplest programs are bound to need modification before they can be compiled and some are just completely impossible to compile.

If programs are written with eventual compilation in mind this isn't such a great problem. It is always useful to include a DEFINT A–Z at the start of such a program so that it will only operate using integer variables when run under interpreted Basic.

This is one area where the Laser Compiler is better. It just ignores a DEFINT statement, so it can be left in when the program is compiled. Mysteriously, the Hisoft compiler doesn't allow this, which is a bit annoying.

The RND function in interpreted Basic usually returns a number between 0 and 1, so this would be quite useless in an integer only program.

However RND is such a necessary function that both compilers choose to implement it in a slightly different way. In the Hisoft compiler it always returns a number in the range 0 to 32767. In the Laser compiler it returns a number between 0 and n–1, where n is the parameter used. So, x=RND(37) would return a random number between 0 and 36.

Both compilers handle the TIME function in the same way, returning it as a 16 bit value rather than the normal 32 bits. This means that when TIME reaches 32767 it goes back to zero. This limits the maximum timeable period to about 3 1/2 minutes.

A problem I found in the Laser Compiler was that it locked up completely when presented with a line containing nothing but a colon. As I am in the habit of spacing program listings by including lines with nothing but a colon I found this quite annoying but I wouldn't class it as a world stopping "bug".

Both compilers frown upon the use of GOTO a line containing a particular command. In the case of the Laser Compiler you are not allowed to GOTO a line with a WEND or NEXT in it. In the case of TurboBasic the instructions say that you must not GOTO a line with DATA in it. In actual fact it appears that a DATA line can never be executed so :

```
10 READ n
20 DATA 37
30 PRINT n
```

will compile OK with TurboBasic, but when the object is RUN it produces a message 'Cannot execute DATA'. Line 15 GOTO 30 must be addded so that when run it never gets to line 20.

Other operational changes between "normal" Basic and compiled Basic include the way in which PRINT USING is interpreted. TurboBasic does not allow it at all, while the Laser Compiler allows all templates but ignores full stops, which would indicate the decimal point position. In this area the Laser Compiler is obviously better.

It is never possible to break out of a Laser compiled program to get back to Basic's immediate command mode. In TurboBasic you have the option of including code to "poll" the Break key when the program is compiled. This is most useful, especially when the compiler is co-resident with the Basic program and allows you to break out of the program being tested so that changes can be made and it can then be re-compiled.

Unlike normal Basic the compilers do not assume that arrays are pre-dimensioned for 10 elements. Instead you must be sure to include a DIMension statement before making reference to an array element.

All these variations between normal operation and compiled operation of commands make certain that you will only very rarely be able to take an existing program and compile it without modification.

The most serious limitation, however, is the use of only integer variables. This is quite a drawback and almost certainly means that programs will have to be written with compilation in mind.

Both programs come with similarly sized manuals, about 15 to 20 pages. Considering the complexity of the programs this doesn't sound a lot, but of course the user will already be familiar with Basic programming so there was no need to reprint a complete Basic manual.

The levels of familarity with Basic the manuals assume are also very similar. Both tend to take a rather technical tack that could leave a first time user a bit puzzled.

I don't see this as a major problem as

Compiler times	Benchmark	Floating Integer	TurboBasic times	Laser	Basic 2
66	1	330	147	36 4.08	31 4.75
246	2	981	714	46 15.52	72 9.92
609	3	2811	2913	391 7.45	388 7.51
609	4	2877	2535	208 12.19	373 6.80
675	5	3045	2703	220 12.29	375 7.21
1269	6	5712	4167	360 11.58	534 7.80
2289	7	8664	6540	464 14.09	589 11.1
	8	10218 Not possible for integer Basic and compilers 1878			

All timings in 300ths of a second.

Timing for Sieve of Eratosthenes program:

	TurboBasic	Laser	Basic 2
No display	8404	456 18.43	620 13.56
Display results	12474	2070 6.03	2640 4.73

Table I: Object code v Basic

most compiler users will probably be people with a bit of basic Basic knowledge who are now looking for some way to spruce up their programs.

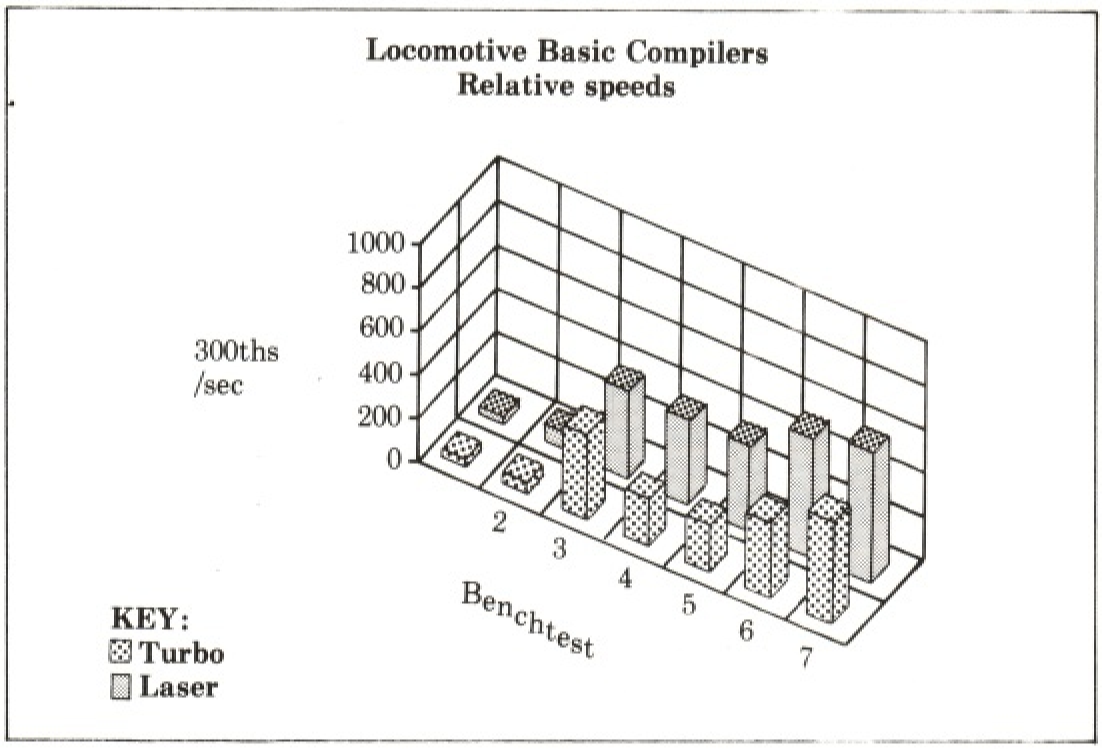
The Laser compiler has support for Ocean's other Laser product, Laser Basic, a large set of RSXs mainly for use with sprites. It will compile existing Laser Basic programs.

However, as the manual states, the speed increase may not be as great as one might have expected. This is because the Laser Basic commands are already written in machine code and are not speeded by compilation.

The only parts of a Laser Basic program that will be noticeably faster are those that perform the logical processing, that is performing FOR...NEXT loops, IF...THENs and so on.

The advantage of compiling a Laser Basic program is that it will produce an object program that could then be sold without copyright problems. Both compilers can be used to produce stand alone machine code programs that could then be sold commercially.

On machines like the Spectrum several commercially available pieces of software have been written in compiled Basic but for really fast action games there really is no substitute for straight machine code.



Having used both compilers quite extensively I prefer the Hisoft offering which I found much easier to use and closer to normal Basic.

Until someone produces a compiler which will take absolutely any Basic program and compile it straight off, producing code which executes in an identical fashion to the original, I remain slightly unsure of how useful I would really find a compiler.

For things like speeding up a sorting program it is obviously a much easier solution than getting your Rodnay Zaks out of mothballs, but for writing the next mega - all - singing - all - dancing - 4D - shoot - em - up - amazing - graphic - arcade - classic, I have my doubts.

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At last – the facts

The new Amstrad PC looks to be all things to all men – a business computer which plays games. A computer which has a wide range of programs and peripherals already available. But what is a PC? And how good is the Amstrad PC1512? Guy Kewney checks it out.

The excitement inside Amstrad at the launch of the Amstrad PC – model PC 1512 – is perfectly understandable. The new machine is a considerable improvement in most respects on the IBM PC which has made IBM the biggest supplier of micros in the world. And it is considerably cheaper than the original, costing a piffling £400.

Of course you may think you already know all about it. Be careful. Actually, this machine was the best-kept secret of the year, despite the fact that everybody knew it was coming, and several people printed precise details of it in advance.

The trouble with all those newspaper headlines, claiming "as forecast in our earlier issue" is that the forecast was just one of many, and nobody had any way of knowing which was correct.

The Amstrad PC runs approximately twice as fast as the original IBM model. In some cases it will run three times as fast. It will run any IBM program that doesn't calculate its speed of running on the number of instructions it has performed. And it will accept any expansion options that don't duplicate features already built into the machine.

Compared with the normal IBM PC it has better colour, a cleverer way of showing a monochrome display, a better sound facility, and includes things like printer socket, modem socket, mouse socket, joystick plug, battery backed-up clock and a very great deal of memory.

That's it, in a nutshell. The trouble is that for people who were originally considering their first step into computing by buying an Amstrad PCW 8256 or 8512, the new machine will seem a bit confusing. And for those who thought they'd buy an Amstrad 6128, for both home and business use, the choice must seem even more baffling.

Let's list a few of the questions that have to be considered.

First, there's the simple one: What is a PC?

Just a computer, is the answer. From a lot of the publicity about the IBM PC business, you may have heard that the PC is a 16 bit machine, a powerful business machine, a professional machine, even an open-architecture machine, or an industry standard machine.

What it really is, is a go-faster Apple II, a basic but flexible computer which provides the scope for many, many add-ons. When IBM launched its PC it was a pretty good imitation of the Apple, which was the best-selling micro around.

But there were one or two improvements over the Apple design, and the main one was memory. Where the Apple II could only have 64k of memory the IBM could have 10 times as much.

The other difference was price.

In those days, five years ago, the price of the IBM PC was only slightly ridiculous. It cost a lot to build, using new chips that were only just out on the market.

Today the excuses for high prices don't hold water. Admittedly the machine which IBM is selling is actually not the PC, but the XT. It's only slightly different, however. The fundamental design hasn't changed. In a word, the thing is out of date. However, it does have one unshakeable virtue – software.

What Amstrad has done with the design is a repeat of what it did with the PCW 8256. It has taken an old design, which is capable of running a lot of established software, and produced a high-tech version of the machine which is both cheap and reliable. With the PCW, it runs CP/M software, and with the PC, it runs IBM-standard software.

The old CP/M software we know. It tends to cost £60 or less these days, and includes famous names like Wordstar and SuperCalc.

But IBM standard software is rather different. To look at it you have to look first at the operating system, MS DOS.

Models

The basic Amstrad PC has one 360k disc, 512k of memory and a white (monochrome) display. It includes Basic-2, MS DOS version 3.2, GEM, Gem Paint, DOS Plus, and several useful utility programs. It has a built-in clock and calendar, and a built-in mouse. It has colour graphics circuitry built in, together with serial port and parallel port. And it has a unique feature – a volume control on its internal loudspeaker. The cost is £399.

The next version is the same box but with a colour screen for a mere £549.

There is a version with two disc drives and monochrome screen for £499 and there is also a version with two disc drives and a colour screen for £649.

Both single-drive systems can be bought with a 10mb hard disc included for £300 extra, or with a 20mb hard disc for £400 extra.

In all cases, they include the same software and extras.

Operating systems – CP/M and MS DOS

There's a simple answer to the question: "What is a PC?" and it is this. A PC is something that runs software intended for the IBM PC and XT.

There's a fundamental difference between software for CP/M computers, and software – even with the same name – for machines that follow the IBM standard.

In the case of CP/M, most software was written for CP/M, not for any particular CP/M machine.



What that means is going to take a little explaining. Without getting technical, you have to understand that programmers who write software like Wordstar and SuperCalc don't rely entirely on their own programming, any more than you would play a piano by lifting the lid and plucking the strings.

There are built-in controls to do that. For a machine with a Zilog Z80 chip, or an Intel 8080 or 8085 chip as its central processor, the controls are available as a program called CP/M.

Things are rather different on the IBM family of machines. The IBM PC and XT use an Intel processor, the 8088. Theoretically all you have to do with a machine that has the 8088 inside it is write MS DOS and plug in an MS DOS program. In practice that won't work, because MS DOS is not the be all and end all of PC compatibility.

The fact of the matter is that no single CP/M machine ever got to be as popular as the IBM PC has done. They were all different – different (though similar) central chips, different amounts of memory, different chips to drive printers and modems, and different internal addresses for the screen memory.

On one machine, putting the number 22 in machine address FF0E would make a question mark appear on the screen. On the next, it would corrupt the program.

So somebody who wanted to print a string of characters would not direct the characters at the chip which actually drove the screen. Instead, they would call the print-string function of CP/M. And each machine would operate its own chips correctly.

On the IBM PC, however, programmers didn't have to be so cautious. On every single IBM PC ever made the top left hand corner of the screen can be directly changed by pumping data into exactly the same memory address. To be sure, there might be some IBM-like machines, for example the Sirius, or the Apricot, where it would be different – but who cared?

There were millions of IBM PCs, and only a few thousands of each "rogue" design. It was worth ignoring the small fry because by addressing the screen directly you could get some pretty fast operations. And all truly successful IBM programs do exactly that.

The list of best-sellers that misbehave in this way include Lotus 1-2-3, Symphony, Framework, Cross-Talk, Think Tank, SideKick, PC-Write, and on and on.

Microsoft, the company which wrote the IBM PC's operating system – PC DOS – also wrote MS DOS. To the consternation of Microsoft's programmers, there were lots of things people wanted to do which MS DOS did very badly. So they didn't use MS DOS. In effect they opened up the piano lid and scraped the strings with a gramophone needle.

Microsoft was very scornful about this sort of programming, which its officials

described as "badly behaved software". It was wasted scorn, especially since programs like Microsoft's own Word, Flight Simulator and Basic were equally "badly behaved".

All that meant that it was very difficult to manufacture a machine which would actually run all IBM software. In effect, it had to be a carbon copy of the original – and how could a carbon copy run twice as fast? Or cost half as much? It had to use the same chips, surely?

No, it doesn't. Even before the advanced technology that brought us first the Amstrad PCW and now the Amstrad PC1512, it was possible to get a better deal than IBM offered. This is made possible by the use of large chips, known as ULAs (Uncommited Logic Arrays) which incorporate the functions of many, many small chips and are very much cheaper to make when used in quantity.

The most successful such machine in Britain was the Olivetti M24, but there were others, more or less respectable, ranging from the full-price, ultra-respectable portable, the Compaq, right down to machines sold under the name Hoki-Koki Computers, or Can-Can Micros.

There is a list of things which these imitations – "clones" – have to do.

Forgiveable faults

There are certain things which the IBM does which its users would be very much happier about if it didn't do. A good example is graphics. The standard IBM display assumes a screen which cannot do proper graphics. You have to buy a colour card and do your lines and circles and textured backgrounds on that.

Not to worry, a company called Hercules designed a card to do colour graphics on the standard screen. This card, while being a very good and popular bit of hardware, is expensive. The IBM graphics options are the aforementioned CGA and EGA.

Amstrad has reached a compromise in providing colour which is compatible with the CGA four colour mode but which can display 16 colours at once. The result is a much prettier display.

However using these extra colours means that the computer has to do four times as much work, which consequently takes time. Still, you can't have everything.

Another example of IBM design which we can do without is the speed of the processor. IBM feeds the 8088 chip clock pulses at a rate of 4.77 MHz, which is slow. With an 8086 chip at 8 Mhz, things clip along nicely, but as a result some software just won't load or run and some add-ins won't work either.

For most of us the fact that a game called Dunzhin, Warrior of Ras will not load is a matter over which no sleep will be lost. For those few of us who buy a PC to run Warrior of Ras, it's a disaster. I'm afraid I'm in the "no sleep lost" class. It isn't much of a game.

Nice extras possible

The Amstrad PC includes the obvious essentials – a display, a keyboard, at least one disc with controller and a healthy chunk of memory. It also has a plug for serial devices – like modems or some printers – and parallel devices – usually printers – built in.

It also has a proprietary video circuit which produces black-and-white text as well as graphics on the Amstrad monochrome display, or a 16-colour display – again, mixed text and graphics – on the Amstrad colour monitor.

And it includes a mouse. This adds a new dimension to the machine. Just about everything else on it – except the price – is a repeat of the best-selling Olivetti M24 design.

But the mouse is unique. Lots of tempers have been lost in debates about

What to look for in a clone . . .

Central processor chip

A clone has to have the IBM's own central chip, the 8088, or a very, very close imitation. The chip in the Amstrad is the same as the one in the Olivetti M24, as it happens.

It is the 8086, also made by Intel. And the Intel 80286 (between four and six times the speed of the 8088) and the NEC V20 chips can be used successfully.

The 8088 chip is a freak, being 16 bit only internally. It behaves in every respect as if it were an Intel 8086, except in the way in transmits data. Like the old CP/M processor chips, it sends data to the outside world down a parallel bus consisting of only eight pins. This means that every time it handles a 16 bit data item on its central chip it has to send it off to the memory in two instalments. This slows it down dramatically by comparison with the 8086 (the one in the Amstrad).

The reason this strange chip was chosen by IBM is simple – it saved money on memory. With the 8086 the smallest amount of memory you can plug in, using standard 64k memory chips, is 128k – because you have to have 16 chips, one for each bit.

With the eight bit 8088 you can have eight chips, or 64k. Even before the IBM PC was launched the price of memory had dropped so sharply that the decision didn't make sense. In effect, the machine was obsolete before it went on sale.

The BIOS

Part of the program called MS DOS is permanently built into the circuits of the computer and is used to load the main "command processor" – a program called COMMAND.COM.

The program that is permanently inside the box is in a chip, and is the Basic Input-Output System, BIOS.

The BIOS has to be identical to the IBM BIOS. Unfortunately IBM refuses to allow this, saying that the ROM is copyright. It has successfully leaned on several people who produced imitations that infringed copyright, making them change the BIOS.

Amstrad has had its own version of the BIOS written by the people who designed the cost cutting ULAs in the PC1512 – MEJ Electronics. The MEJ ROM Operating System (ROS) is designed to be as compatible as possible without using any of IBM's copyrighted code. The ROS succeeds in its aim and will run anything sold for IBM PCs and near compatibles.

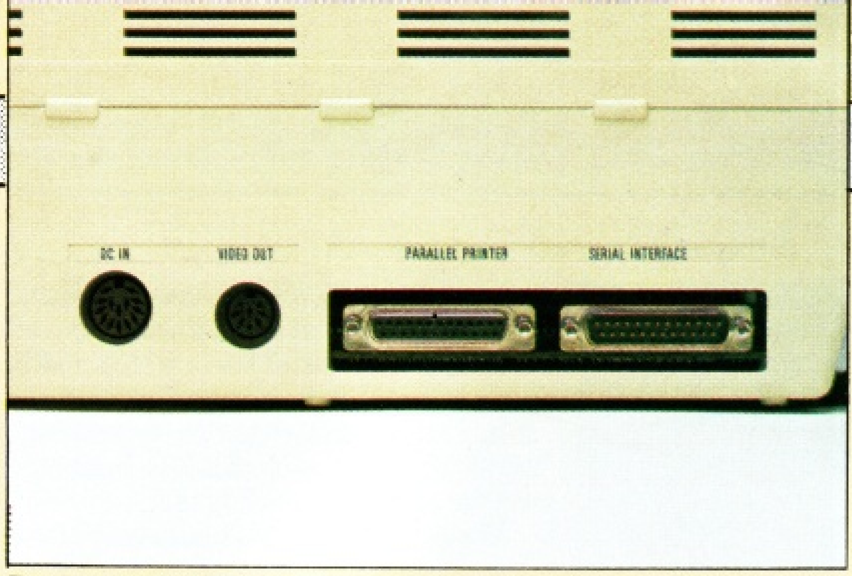
Communications ports

Part of the IBM specification is the disc controller chip and the input-out con-
troller. Astonishingly clones have been launched which cannot read protected IBM discs, because they have a different disc controller chip which behaves differently – it has different faults.

Similarly there are makes of imitation IBM which won't run communications software that works on the IBM because they have different serial port chips.

Screen memory

There are machines being sold today which disobey the fundamental requirement of PC compatibility – the screen memory is in a different (logical) part of the computer.



Back view of the 1512



The mouse makes moving round the screen very simple

mice and not all the opinions put forward have been well-informed.

The mouse is a pointing device. It allows an operator to keep both eyes firmly fixed on the screen, watching an arrow moving around, following a path decided on by one hand moving the mouse around the desk. Move the mouse left, and the arrow moves left.

The normal, pre-mouse, method of moving the screen cursor around the screen was complex. You had to find cursor control keys and press them – the "up-arrow" five times, to move up five lines, then the "left-arrow" 30 times to move to the left by 30 characters.

That's tedious, so programmers put in refinements – for example, hold down shift, press the left-arrow and move one word at a time. It got very complex, and in a program such a Wordstar real skill is needed to get from one point on the screen to another.

The mouse makes that sort of thing very, very simple – if it is properly designed. That is, if the software is properly written.

There is another thing that the mouse does well, and that is its ability to point to control words on the top of the screen.

Properly done, this system of control allows a user to point at a control word and open up a window on the display (see illustration). The mouse arrow can then be moved down a menu of possible options and a button on the mouse can be pressed when you find the one you want.

It's quite easy to find people who will tell you that this isn't a good idea. The problem is that not all of them know what they're talking about. Most programs that use mice don't do it well. Properly done, a mouse-driven program needs no manual – you just start pointing the mouse at the things you want to do and it all happens.

The Amstrad mouse, unlike other IBM PC clones, is built into the machine. Anyone who writes software for the Amstrad *knows* that the user has a mouse. Mouse control can be built into the program from day one, and it can therefore be done properly. That is not to say that it will be.

Normally this isn't a consideration with an IBM clone because all the software people want is already on the market. And programmers write for the standard IBM machine. However, the price of the Amstrad and Amstrad's reputation means that there could, very likely, soon be enough purely Amstrad users to make it worth while writing Amstrad-specific software.

The mouse appears to the rest of the system to be a Microsoft bus mouse.

In those cases programs which talk to the IBM screen just don't work. The best-known test of screen compatibility is the Microsoft branded program Flight Simulator, which was written by SubLogic. This is possibly the worst flight simulator on the market, but has sold thousands and thousands of copies just so that people could prove that their clone was PC compatible. It runs fine on the Amstrad PC.

Expansion slots

The beauty of the IBM PC's design is that it can be added to. If IBM didn't include the feature you want, you can plug a card in – and it's easy, because there is a totally defined expansion bus. Anybody who wants to, can build a circuit board which plugs into the machine, and IBM will provide full specifications.

These boards include memory expansion boards, special purpose graphics cards for colour displays, hard discs, optical discs, laboratory instrument controllers, networks, modems, and even completely new computer boards. To be a real compatible a machine needs to be able to use these boards in exactly the same way as an IBM PC does.

In general the Amstrad PC passes this test with flying colours It has three spaces for add-in IBM cards, and they are full size. The Amstrad PC is, however, physically much smaller than the American machine and this lack of space outside has led to less space inside. The result is less room for add-on cards.

Anyone who built a card for the PC will have assumed the same physical dimensions and so while the electrical connections for all the major add-on boards are perfect, the shape of the box they have to fit into is not. To counter this problem the three PC 1512 slots differ slightly in physical, but not electrical, design. This means that all the PC cards which Amstrad has tested – and there are a lot of them – fit and work.

There is one serious exception, an IBM-designed enhancement to the graphics called the Enhanced Graphics Adaptor. This is not to be confused with the Colour Graphics Adaptor, or CGA.

The EGA doesn't just add colour, but provides much higher resolution graphics than the standard IBM and more colours, and is expensive, involving the use of a special-purpose display screen. The EGA is a dreadful bit of design and, quite understandably, when Amstrad was designing its PC, the decision was made to ignore this standard.

Unfortunately logic is a poor guide to the minds of computer users. The EGA system, which cost more than £1,200 at the beginning of 1986, can now be plugged in for £400. At best, it works as though it's broken, but despite all that, it is *the* most popular add-on for American PC buyers today.

The Amstrad PC cannot, and never will, work with it. This is irrevocable, say the designers. On the other hand there are reasons for thinking that it isn't a disaster – see "Nice extras possible" above.

The IBM PC has a great many more than three expansion slots. However, on the Amstrad PC you don't need more because so many of the things that other people plug into the IBM PC family are already included in the Amstrad's basic design.

There are several designs of mouse. Some of them take up the serial port of a micro, others occupy a slot on the bus, and all of them require careful installation. This one just sits there and works. Having the mouse built in saves an expansion slot.

GEM, Windows, Desq, other operating backgrounds

There are, already, important programs that require you to buy a mouse. Two of them do their best to look like an Apple Macintosh – Microsoft Windows, and Digital Research GEM. The latter is the one provided, free, with the Amstrad.

The normal way of finding out what programs are on a disc with an IBM clone is exactly the same as with a CP/M machine. You load the operating system, and wait for it to say "A>" and then you type DIR. A list of file-names then pours on to the screen.

Under GEM you have the option of seeing the files as if they were pieces of paper lying on a desktop. The mouse pointer can be used to select one of them, the mouse button can be pressed – or "clicked" in PC jargon – and the program,if it is a program, will be loaded and run. For obvious reasons this is known as the GEM desktop.

There are nice little extras to using GEM, including a couple of desktop utilities, but the two main benefits are graphics and the ability to find programs.

Finding programs on a big MS DOS file isn't very hard because normally they all have names ending in EXE or COM. Knowing which program to run, however, is another trick.

Under GEM, if you are thoughtful you can work out a system of file labelling so that GEM will always load the right program. All you need to do is put the mouse on the file and click twice and GEM will find the appropriate command file – program – and load it.



The system discs

Graphics and Basic-2

GEM stands for Graphics Environment Manager. The Amstrad PC makes the most of GEM by the excellent Basic programming language, Basic-2, supplied with the machine.

There is a theory, usually justified, which states that serious programming tasks shouldn't be attempted with Basic, but that the average beginner can soon learn to do useful little tricks with that language.

This is because of the way Microsoft's own version of the language evolved. It started out as an 8k program inside the Commodore Pet. There was no disc, so no disc commands for getting files, examining them, building them and writing them.

When Microsoft wrote a disc Basic it had to tack all these commands on top of a lot of rubbish that was already inside. And the result is that you can easily make serious errors if you get ambitious and write large programs.



Locomotive Software has produced Basic-2 as a way of getting away from all that. It's a version of Basic which makes little attempt to be compatible with the commands of Microsoft, but which relatively naive users ought to be able to use for quite powerful work.

The other thing that's different about it is the graphics. Basic-2 uses GEM, it takes up an awful lot of memory, but the Amstrad isn't short of memory. In exchange it provides all the nice windows, graphics and mouse controls that GEM has built in.

Actually it is a lot better than GEM itself, which has a lot of ideas nicely planned, but badly executed. Locomotive has managed to tidy these up.

One good example is window redrawing. When you open up a window it is like dropping a piece of paper onto the top of the one you are looking at on the screen. Logically you might suppose that when you close the top window you ought to be able to see the bottom piece again. Locomotive wrote its windows program in order to make this work.

So if you write a program that draws a clock and makes it work – tick, tock, etc – and then open up a window that shows the calendar on top, under Basic-2, when you hide the calendar the clock will come back but it will take a a few moments for calculation before it will show the right time.

Comparing the 8512 with the 1512

Word processing software

The machines which made Amstrad the biggest name in UK microcomputing were the word processors, PCW8256 and 8512. Both come with a word processor called LocoScript. However LocoScript is dedicated to the PCW computers. It won't work on any other machine, not even the Amstrad PC. Amstrad will sell you a copy of Wordstar 1512 to run on your PC or you can buy one of many, many other word processing programs off the shelf.

Colour

For the same reasons that make Locoscript possible on the PCW, it isn't possible to run a colour PCW machine. Maybe one day Amstrad can upgrade the PCW to produce a version with a better printer, but colour? No. So if you want a word processor that costs £400 complete the PCW is the one. But if you want a machine that includes colour display then consider the PC.

Basic

The Basic supplied with the PCW is Mallard Basic, written by Locomotive. It is fast and similar to – but cleverer than – Microsoft's Basic. There is no way to do

the clever graphics and windowing that Basic-2 does. Basic-2 cannot run on the PCW.

Applications programs

Most programs originally written for the PCW are CP/M programs and assumed you had a machine no bigger than 64k. The PCW can have 512k, but for most CP/M programs 448k of that are wasted. On the PC there are 512k as a minimum.

There is no way to buy a system with less, and for a little extra you can increase that to 640k. Indeed it is expected that a large number of users will "fatten" their PC in this way.

A very great deal of PC software these days assumes that you actually have, and will make good use of, at least 512k.



PC1512 and PCW8512

Inevitably this means one simple fact – PC software can be, and often is, very much more powerful than 8 bit CP/M software.

But it means one other, equally simple fact. A lot of CP/M software is old, unglamorous, and therefore costs very, very little. By contrast a lot of PC software costs more than £500 – things like Lotus 1-2-3, Framework and the like. It's an important difference.

Comparing the Amstrad PC with the 6128

Screen

The colour screen of an Amstrad 6128 is just barely useable for business software. The colour display on the PC is very much better and accounts for some of the difference in price between the two systems.

However the paper-white colour of the monochrome PC display is very, very good indeed. Each colour is shown on the screen with an appropriate level of grey, so that colour is almost redundant in pictures. People who buy the CPC6128 for business, however, are usually kidding nobody but themselves, and we all know that their main priority is to have something that they can play games on.

As a games machine the PC has a serious problem in that it isn't compatible with the IBM PC Junior. And a very great deal of American games software was written, not for the PC, but its baby brother.

When buying games for the Amstrad PC I think you should reckon on using the colour screen, and you should also look carefully on the packaging to make sure it doesn't require a PC Junior – for example, Ghostbusters. That is a very different machine and, quite often, Junior software just won't run.

Analogue joysticks

The IBM joystick is not a games joystick, but a pair of variable rheostats, like a pair of volume controls on a radio. The slot on the Amstrad PC keyboard takes a switch joystick. As long as you don't buy an Amstrad joystick in the belief that it will work with American games programs that look for an IBM joystick, you're all right.

You can, I'm told, plug in an IBM joystick controller card. I didn't have a chance to try this myself. *(We have seen an analogue joystick working at Amstrad Computer User, but since the joystick and circuit board cost over £50 there won't be many PC 1512 users buying them, for the moment at least. – Ed)*

Speed

Of course the CPC6128 is "only" an 8 bit machine. The PC is a powerful 16 bit computer. Don't try translating this into the assumption that games will run far better on the 16 bit machine. For its purpose, the Z80 chip in the 6128 is very powerful, and unless the game requires large blocks of memory to be moved around quickly the quality of the programming will count for more than the speed of the chip.

That said, do be aware that some games are written for a standard PC and will be too fast for you to play on the Amstrad PC. Unfortunately there's no way of knowing which, in advance, will suffer this way.

Comparing the Amstrad PC with the IBM PC

I did this the simple way, by getting as many programs as I could and running them on the Amstrad.

In one or two cases they didn't run. In most cases they did, and the same applied to plug-in cards – they worked.

So the Amstrad PC is very compatible with the IBM PC. However it does offer 16 colours in a high resolution mode where the IBM offers four. It does offer grey-scale monochrome where the IBM offers text only. And it generally runs three times as fast as the IBM. Last, but not least, it is approximately one third of the cost of an equivalent IBM.

Comparing the Amstrad PC with the Olivetti M24

The M24 is the most successful UK clone of the PC. It is in most respects an improvement, in exactly the areas that the Amstrad is, and shares with the Amstrad the problem of not being able to "turn off" its built-in functions, like colour graphics.

It has the edge over the Amstrad in graphics, where it provides a much, much better screen resolution. On text in colour you can count the Amstrad's screen pixels, but the Olivetti has nice, clear, typescript style letters.

Well you have to get something extra for this – the Olivetti is at least three times the Amstrad's price.

Comparing the Amstrad PC with the IBM PC/AT

The PC AT is the IBM machine that uses the very big brother (or sister) of the Intel 8086 chip in the Amstrad. The Intel 80286 can in theory control 16 megabytes of internal memory, compared to the one megabyte limit of the 8086. It runs a LOT faster.

At the moment the cheapest AT-alike machines are 50 per cent more costly than the Amstrad PC. They don't, typically, include the sort of extras – ports, mice, built-in colour and screen – that the Amstrad does.

For people who have to have that extra margin of speed, an AT clone is worth the extra margin of cash. And one day there will be a version of MS DOS that actually uses all that extra memory. Until that happens, there isn't a lot of point agonising over the choice. And generally you're talking about a £1,500 system.

What sort of "home" software is available for a PC? In America, a lot. In the UK, rather less, because PCs have been, traditionally, business machines. Expect this to change, now that the Amstrad PC brings IBM compatibility down to the £400 mark.

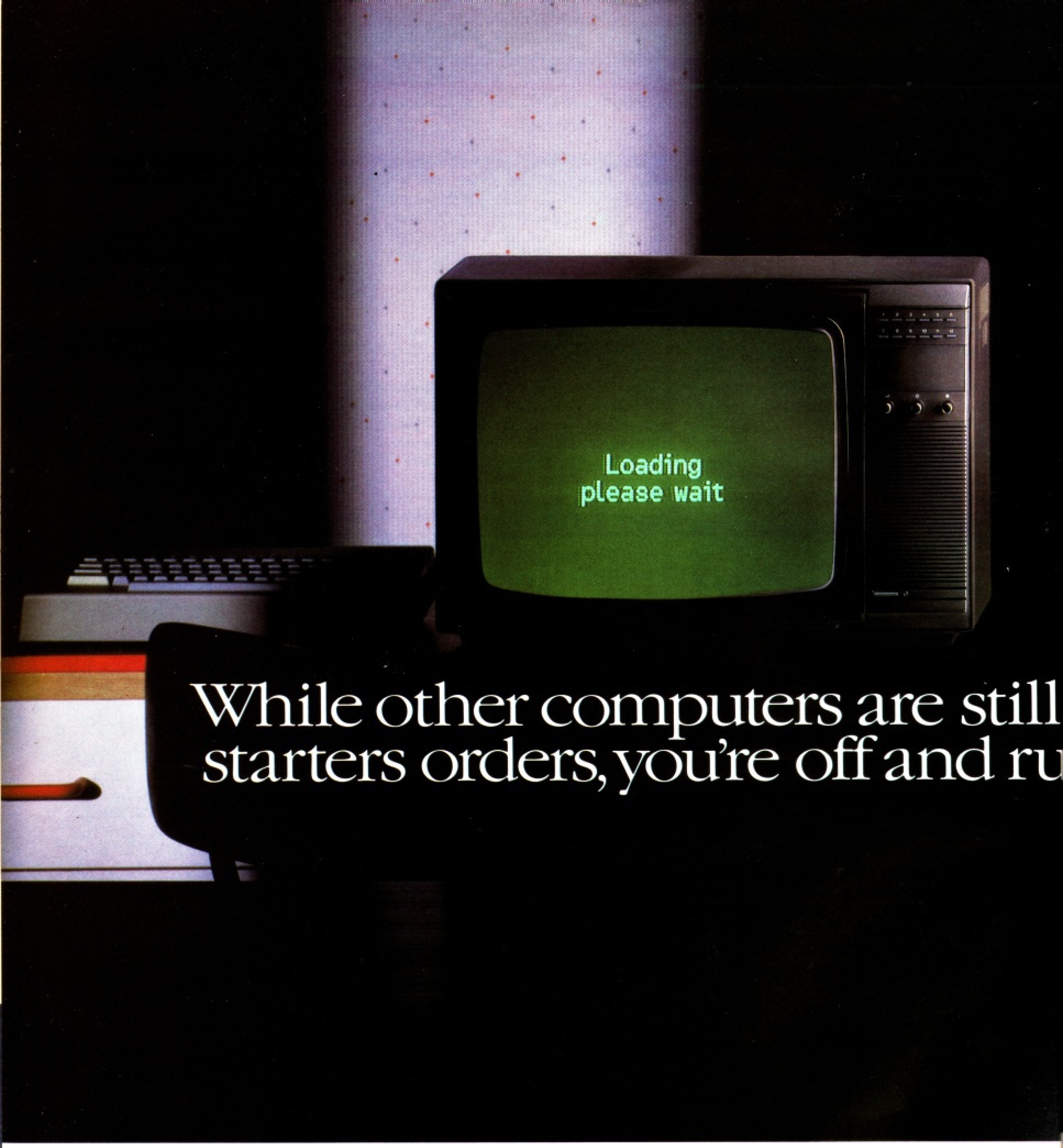
Conclusion

For someone who wants to run standard IBM software and plug in normal IBM add-ons there isn't a serious alternative to the Amstrad PC at the price and, with the possible exception of the Olivetti, even at three times the price.

It is faster, easier to use and cheaper, and includes as standard some options normal PC buyers wouldn't think to get, or might have trouble attaching. For someone who must have enhanced graphics it isn't an option.

Amstrad must be hoping that this machine won't affect sales of its PCW range, on the grounds that it costs about £150 more to buy a PC with printer than the PCW. It's a gamble, but my own feeling, now that the PC is out, is that this is the machine to buy.

ACU



While other computers are still starters orders, you're off and ru

The Amstrad 6128 has a built-in advantage over most other home computers.

Its fast loading disc drive unit.

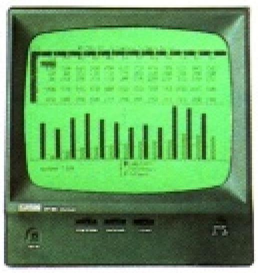
An ordinary cassette driven computer can take as long as 15 minutes to load.

Whereas the 6128's built-in disc drive will load the same programme in seconds.

Which means you don't waste valuable playing time loading.

And it also means you can quickly get into more sophisticated programmes, using more of the 6128's big 128K memory.





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BASIC 2

To complement the PC 1512 Locomotive Software has produced Basic 2, a language which maintains many features of old familiar Basics but which offers the power of newer, more flexible languages. Simon Rockman runs through its capabilities.

A computer language is much like a natural language in that it has both a vocabulary and grammar. If you know Microsoft or Locomotive Basic you will have a starting point for learning Basic 2. But that is all . . . a starting point.

The vocabulary has been extended and many new rules of grammar have been invented. Basic 2 has many features which you are unlikely to have come across before, but as Howard Fisher of Locomotive points out: "Basic 2 is trying to be as much like Basic as possible". It should be possible to take a Microsoft Basic program and run it under Basic 2 – although it would have to be quite straightforward for it to work in the way you would expect. But even so, conversion would not be that difficult.

GEM for graphics

The main influence on the "feel" of Basic 2 is the use of GEM, the Digital Research Graphics Enviroment Manager. This provides a set of building blocks with which the machine code programmer can easily produce graphics.

Basic 2 opens up these facilities to the Basic programmer and it is the nature of these building blocks which makes Basic 2 seem so different from other Basics.

GEM is a WIMP – that stands for Windows Icons Mice Program. The idea is that all the action takes place on a desktop. You open folders and put papers on a desk,then proceed to cover up other folders and papers already on the desk.

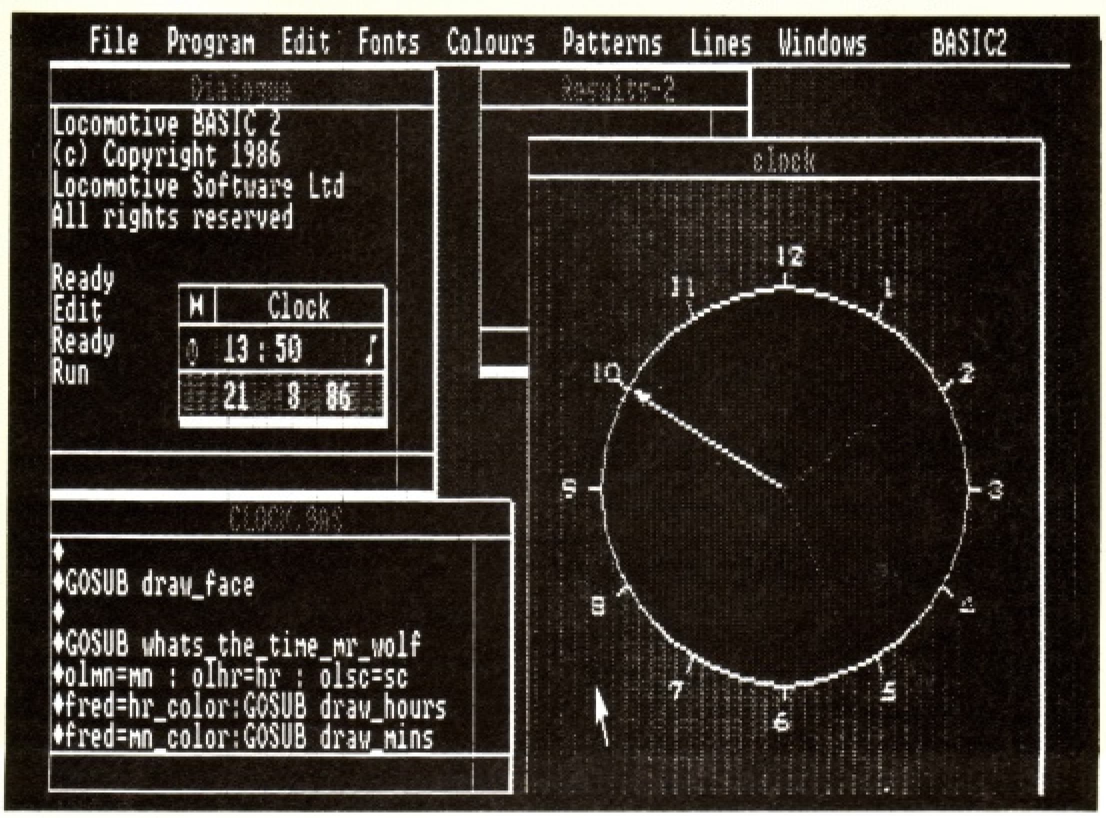
You look at the contents of a folder by opening a window, which is a small screen within the main screen. You can have several windows open at once and Basic 2 uses four windows as standard. These are called Dialogue, Edit, Results-1 and Results-2.

Dialogue is used to communicate with the computer, doing things like running a program and all the sorts of things you do in direct mode, without line numbers.

The Results-1 window shows the output from a program – if you are drawing or printing text it will end up here.

The Results-2 window is text only and this is hidden as a default – in the short time I have spent playing with Basic 2 it did not get used very much.

The fourth window is the important one to programmers. This is where you create your Basic 2 masterpiece.It provides a full screen editor and you can move the cursor either with the mouse or with the cursor keys, which means you could use a joystick toggling between the two by using the control key.



One of the foibles of Basic 2 is that it does not use line numbers – each new line is marked by a diamond. The editor is very much like a word processor in that you can cut and paste sections of program.

Since there are no line numbers it is easy to duplicate sections of code and then make any minor changes needed. To identify a line for a GOTO or GOSUB you can use a LABEL. Each of these is identified by the keyword LABEL, unless it is a number. So the program:

```
10 PRINT "HELLO WORLD"
20 GOTO 10
```

still works, although it could equally well be written as

```
♦LABEL hell PRINT "HELLO WORLD"
♦GOTO hell
```

The lack of line numbers means that you can't run out of space between lines when you want to insert a subroutine, but it also means that you cannot list the program from the middle.

Two features of Basic 2 mean that this is not much of a handicap. When a Basic error occurs the system jumps into edit mode with the cursor on the line in which the error was detected. This does not help much if the bug is due to a mistake somewhere else in the program, what does help is the way in which GEM windows work.

You can get to any part of the listing by using scroll bars along the edge of the window. These let you slide the window up and down the listing or jump directly to any part of the program. Mastering the editor is a skill which takes a short while and will save most programmers a great deal of time.

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‘If you thought that text was complicated then graphics are mind-blowing’

Text or graphics

When programming a CPC it is quite simple to separate text and graphics commands, but when you are using GEM with Basic 2 the definitions blur a little. GEM does not allow for User Defined Graphics (UDGs, the SYMBOL command). Instead you have a variety of fonts which come pre-designed, although you will need special software to allow you to design your own.

Instead of using a set matrix for the font – 8 by 8 in the case of the 464 – GEM allows the user to have lots of different sizes of character. The programmer can place the characters either in cells, a whole letter at a time, or in user coordinates. This is a little bit like using the TAG command on the 464. Text does not even have to be printed in straight lines as the ANGLE command lets strings climb up and down the screen.

The font can be displayed in any one of 16 colours and can have a number of special effects applied to it. These can be used to create light, thick, italic, underlined and reversed text.

When you think that several efects can be used at once you will realise how flexible, and confusing, just printing a string can be.

To make life simpler for the programmer there is a text-only window, Results-2. This adds a large number of commands to handle the window as a whole.

The current cursor position is used as a marker and you can clear from the cursor to the end of the line it is on, from the beginning of the line to the cursor, the whole line containing the cursor, the window up to the cursor and the window from the cursor. Basic 2 sounds like the ideal language for writing an adventure.

If you thought that text was complicated then graphics are mind-blowing. Basic 2 keeps track of how big a window is and rescales all graphic commands to fit. This means that if the window size changes after something has been drawn within it then all the graphics are re-scaled and re-drawn to fit.

A straight line is supposed to be the shortest distance connecting two points, it has length but no width. According to GEM this is not so. A LINE drawn under Basic 2 can be assigned to a stream and it has width, a style and colour. The styles can include dotted and dashed lines. It can also draw under, over or through anything it crosses on the screen.

Thankfully GEM makes lots of complicated things easy to do, but this results in lots of parameters. You can draw an angled segment of a pie chart and fill it with red bricks, all with a single command. But getting the slice of pie to the right place and doing the right things takes a lot of practice.

Still this makes Basic 2 look like a good language for a graphics adventure. There are plenty of different shapes and turtle graphics. All this is very flexible but it is pretty slow. Basic 2 is not a language for writing action games.

Fantastic files

Mallard Basic on the PCW features the Jetsam system of keyed filing. This takes some getting used to, but those who know it love it. The technology has been transfered to Basic 2, so you can easily store random access files, adding the latest Cliff Richard LP to your database when you buy it in a fit of nostalgia and then deleting it easily when Oxfam come to collect.

For more serious uses we should see some very powerful applications being developed using the database capacity of Basic 2, ideal for storing the map of a complicated adventure game.

Mathematical marvel

One of the major drawbacks of Basic 2 is that you cannot CHAIN or RUN one program from inside another. This means that you cannot have overlays – the whole program has to be loaded in one go. Because of the way in which GEM works it is impossible to give a typical figure for the amount of memory you have free from Basic.

On a 464 without a disc drive you have 1k more than a machine with a disc. You can use SYMBOL AFTER to give yourself more RAM or load in some RSXs to give you extra commands. With a GEM- based system the amount of RAM you have for the program depends on which support programs you have.

Things like a calculator on a pop-up menu can be included, and how many fonts you have. It is a simple matter to expand the PC 1512 to 640k, which will give you more room from Basic, but whatever your set-up your program will never have very much more than 45k to play with. This may well sound like a lot but it is very easy for software to eat into your RAM.

You can use the filing to store as much as possible on disc but large arrays will munch memory. To reduce this appetite Locomotive has added some special types of variable. You can limit numbers to values between -127 and 128, 0 to 255, -32767 to 32768, 0 to 65525, integer and floating point. Machine code programmers will recognise these numbers as affecting the word length of a variable. The memory savings are dramatic.

Basic 2's greatest strength is its speed of calculation. Using the standard benchtests you will find that a PC 1512 running Basic 2 is faster than nearly any other micro running Basic. It is a shame that GEM slows down the graphics so much.But this is forgivable when you realise how much work GEM is doing.

In addition to keeping track of all the graphics on screen, GEM looks after the off-screen graphics so that if a window grows the new shape can be shown.

Scrolling is not easy on a PC 1512 because the screen memory is as large as the entire RAM of a 464. This is how the machine manages the equivalent of 16 colours in Mode 2.

No machine code

The WIMP enviroment of GEM looks after memory allocation. This would make mixing machine code and Basic impossible. As a result Basic 2 has no commands to PEEK, POKE or CALL machine code, everything has to be done through GEM. So if you want to address additional hardware from Basic you will need to understand GEM and be able to write a GEM driver - no easy task.

Conclusion

Computer languages have always been developed with particular applications in mind. Lisp for list processing, Prolog for artificial intelligence and Forth for contolling radio telescopes.But programmers have often adapted languages to suit their needs. Atari developed a version of Forth for writing games.

Basic started life as a programming language which could be used to teach Fortran, but it has progressed from there. Basic 2 is ideal if you have a lot of number crunching and data processing to do. GEM works well if you want a complicated static display but Basic 2 is not suited to animation or control applications.

Perhaps there is room for a games language, not unlike Laser Basic on the CPC, to run outside GEM. Meanwhile if you have the plot for a great text and graphics adventure then get coding.

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Just for you...



In the field of word processors there are two major add-ons, spell checkers and mail merger programs. The delights of LocoSpell still await us but LocoMail is available now. Simon Rockman tests his IQ to the limit and takes a look.

Mail merging is nothing to do with the Post Office buying out Securicor. It is the way Readers Digest produce the letters which start with "Dear Mr Rockman" and end with "so there could be £10,000 waiting for you".

No one from Readers Digest has singled you out. Everyone in your street got a similar letter, written mainly for the benefit of the Post Office and the local dustmen.

They buy lists of people who have joined particular clubs, stayed in particular hotels or bought shares. Amstrad have such a list of people who have returned guarantee cards which is used to send out leaflets.

LocoMail is a program which will take a list of people, held as a LocoScript file, and address a letter to each of them. This is a boon to anyone who uses a PCW computer in business.

If you have 100 customers who need to be told when you put up your prices then you can send each one a letter explaining how you have been absorbing increases from your suppliers and how you hate to have to pass on the latest increase, blaming it on the rise/fall in the dollar, the current government or the price of oil.

If you are the secretary of the local darts team or the leader of a scout troop then you may wish to send out details of matches or camps.

What LocoMail can do for you

Most of these functions could be handled by a simple labelling program, but LocoMail can do a lot more. In the first instance this is a simple program which takes two files and joins them together again and again.

But LocoMail can also be seen as a database, a calculator and as a programming language. The functions are difficult to separate but let's start with the database aspect.

A database is a collection of bits of information held together in some kind of order. A telephone book is a database of subscribers.

The most likely thing that you will want to store on your database is the name and address of people you know. You may also want to store some other information about them, such as what discounts they get or if they are suppliers or customers. You may also wish to store other information like telephone number, birthday, marital status, darts score or which scouting badges they have.

The important thing is to work out what information you are going to need before you begin. It is worth remembering that there are legal restraints on what you can store without registering under the new Data Protection Act.

By programming LocoMail you can search the database to print letters which contain only part of the information. Neater still is the ability to only print letters which need to go to one class of people – begging letters to customers, "the-cheques-in-the-post" letters to suppliers and the "see you at the 19th" letters to members of the golf club.

Yet neater still is the ability of LocoMail to alter individual letters so that someone who is both a customer and a member of the golf club gets a letter with both paragraphs.

As a calculator, LocoMail can add, subtract, multiply and divide. It can also prompt from the keyboard. This is particularly useful for a job like invoicing.

If you have 100 customers on your database you can sit down at the end of the month and work through the list with the computer filling in standing orders and applying appropriate discounts as you enter the quantity for particular customers. LocoMail will fill in all the routine information and allow you to concentrate on the difficult bits.

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How LocoMail works

Each copy of LocoMail is supplied with a new version of LocoScript. This is because LocoMail will only work with LocoScript versions 1.3 or newer. Don't worry about having an old version – you only need the upgrade if you want LocoMail.

When you load LocoScript with LocoMail you will see the top line of the screen has become a bit crowded. In addition to the E for Edit, C for Create and P for Print there are two new options – M for Merge and F for Fill.

Before doing anything it is best to refer to the manual. If you have no knowledge of programming, it is best to take things slowly at first and re-read bits when you don't understand why things are happening.

The manual matches up with some example files on the LocoMail disc. By looking at the files you can learn what the program requires.

This turns out to be three things: A master document, a data file and a file which explains what the elements of the data file are.

Filling a document is a bit simpler, since there is no datafile and consequently no descriptive file. When you fill a document, each item of transient data has to be entered from the keyboard. This is fine if your mail shot is a one off and saves the hassle of setting up a data file.

Some less transient information can be stored from letter to letter, but must be re-entered at the start of every session. The examples given in the manual are date and sender's name. While these may change from day to day (I would hope that the date will) it is silly to have to enter them for each letter.

If you have to send stuff out more than once it is worth setting up a merge file. To work out what needs to go into the data file the manual suggests that you create a typical letter and edit that to produce a master document.

LocoMail adds two new codes to LocoScript. These are (+Mail) and (–Mail). LocoMail regards anything between the codes as being part of the program.

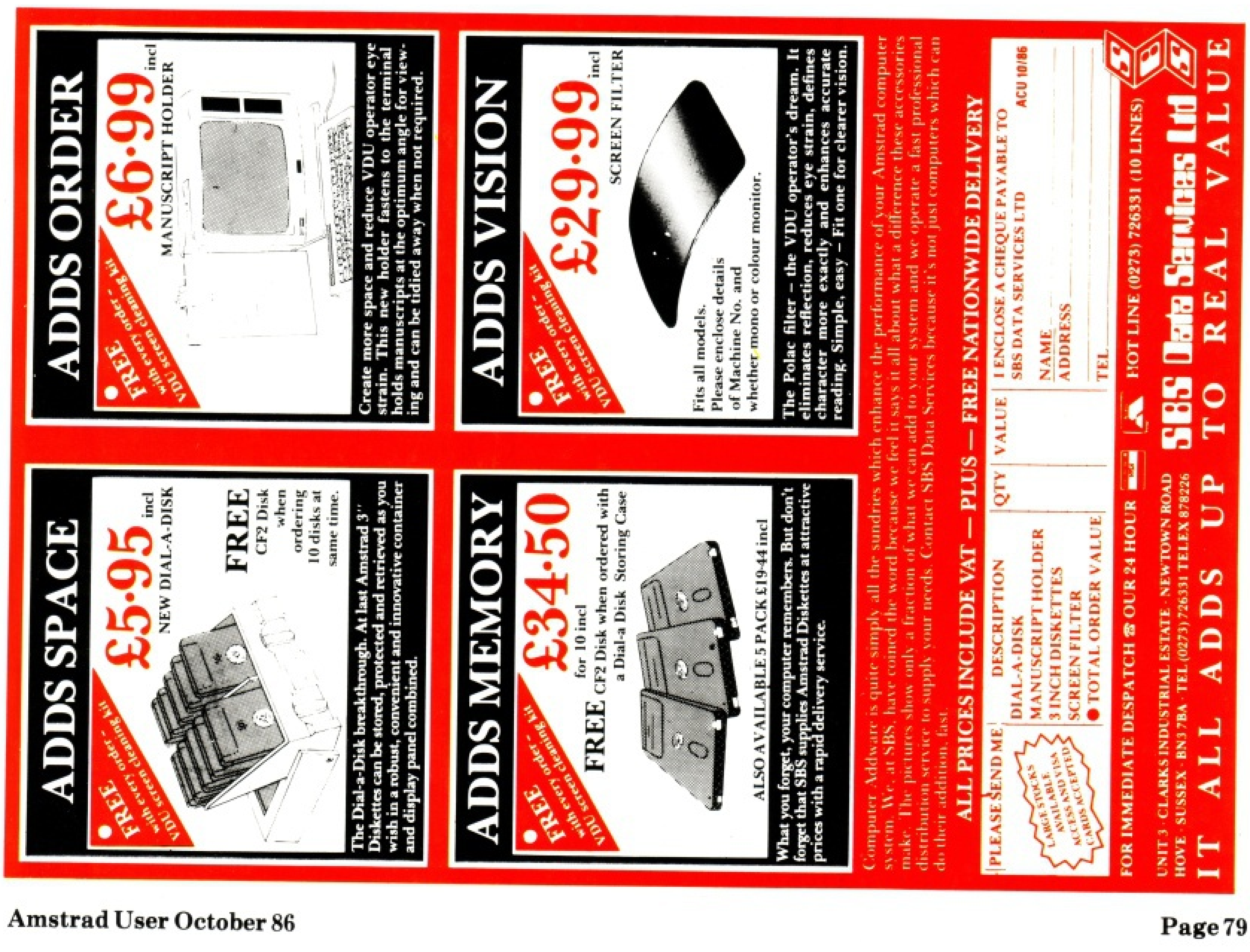
There are some special characters to perform the clever functions mentioned earlier. +, –, * and / take care of the mathematical functions. The = sign assigns a variable and a ? asks for new information. The ? can also be used to assign an input to a variable as it is read in by putting the variable name before the ? and to print a prompt by putting it after the ?. This dual use is known as a dyadic command.

Once you have the master document you need to create the data file. The data record template is the bit of text which lets LocoMail know where the record should be broken up into fields. This separates the address from the name and the company name from the phone number.

Most other mail merge programs use the same character throughout the document, but this can get confusing. LocoMail can use a symbol as a separator so long as it won't appear in an address. This means that you can't use numbers and letters and also rules out characters like & if you are sending letters to Marks & Spencers.

Locomotive Software has realised that there are a lot of people who already have datafiles written for existing programs so LocoMail will use those with very little conversion.

All in all, LocoMail is very powerful. Amstrad's technical people have suggested many uses other than mailmerging, including multiplication tables and bar graphs produced from merged information. The manual is better than many I've seen, and there's also an easy guide in preparation. I feel that this has been worth the wait. **ACU**



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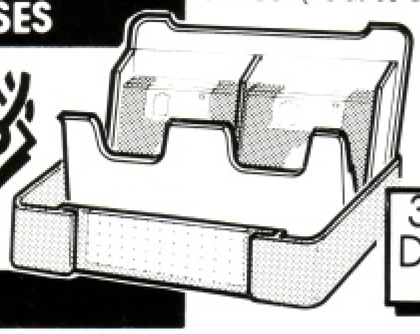
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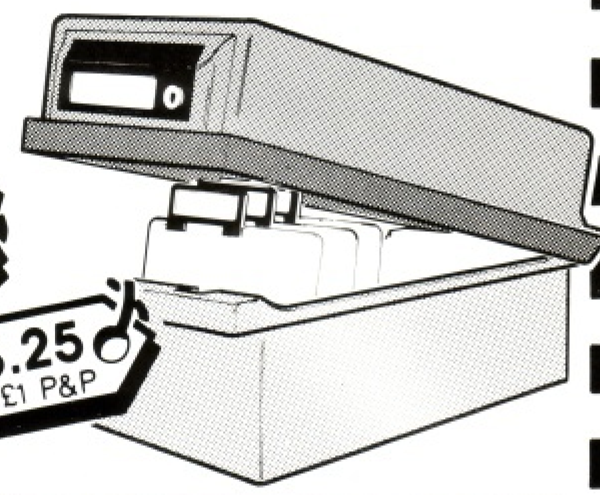
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We're only a local phone call away

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Send and receive telex messages

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What does it all cost?

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How much it costs to use MicroLink

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Applicable for duration of connection to the Service. Minimum charge: 1 minute.
Cheap rate is from 7pm to 8am, Monday to Friday, all day Saturday and Sunday and public holidays; Standard rate is from 8am to 7pm, Monday to Friday, excluding public holidays.

Filing charge: 20p per unit of 2,048 characters per month.
Applicable for storage of information, such as telex, short codes and mail files. The number of units used is an average calculated by reference to a daily sample.

Telex registration: £10.

Outgoing telex: 5.5p per 100 characters (UK); 11p per 100 (Europe); 18p per 100 (N. America); £1.25 per 400 (Rest of world); £2.75 per 400 (Ships at sea).
Deferred messages sent on the night service are subject to a 10 per cent discount.

Incoming telex: No charge.

It is not possible to deliver a telex without a mailbox reference. If a telex is received without a mailbox reference the sender will be advised of non-delivery and asked to provide a mailbox address.
Each user validated for telex and using the facility will incur a charge of 6 storage units a month. Further storage charges could be incurred depending on the amount of telex storage and the use made of short code and message file facilities.

MicroLink PSS service: 2.5p per minute or part (300 baud); 3p per minute or part (1200/75 baud).
Only applies to users outside the 01-London call area.

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Telemessages can be sent with an illustrated greetings card for 75p extra.

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If you have a BT Radiopager you can be paged automatically whenever a message is waiting in your mailbox.

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These charges relate to the transmission of information by the Dialcom service to other Dialcom services outside the UK and the Isle of Man. Multiple copies to addresses on the same system host incur only one transmission charge.

Billing and Payment: All charges quoted are exclusive of VAT. Currently all bills are rendered monthly.

Software over the telephone

MicroLink is setting up a central store of software programs which you'll be able to download directly into your micro. The range will include games, utilities, educational and business programs, and will cover all the most popular makes of micros.

Talk to the world – by satellite

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What you need to access MicroLink

You must have three things in order to use MicroLink: a computer (it can be any make of micro, hand-held device or even an electronic typewriter provided it has communications facilities), a modem (it can be a simple Prestel type using 1200/75 baud, or a more sophisticated one operating at 300/300 or 1200/1200 baud), and appropriate communications software.

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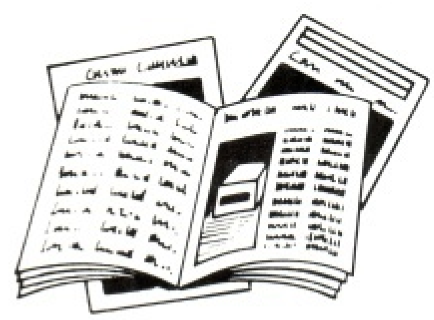
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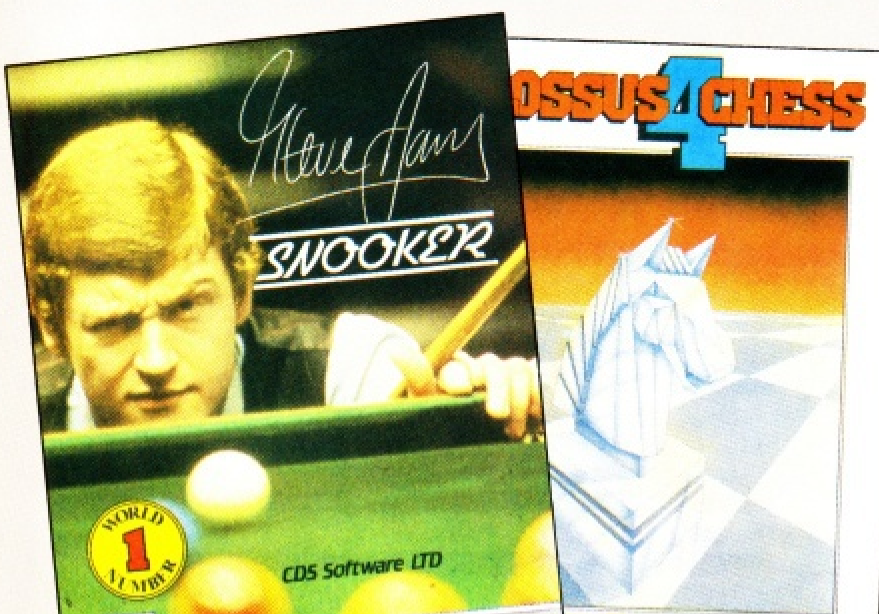
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CDS have been very generous in offering to give a PC1512, worth over £450, to a sharp witted reader of *Amstrad Computer User*. Ten runners up can choose a CDS game as a prize. There are three questions, each relating to a CDS program.



The questions

1. CDS snooker is endorsed by Steve Davis (the man with the white Porsche and the number plate SD 147). In which year did Steve Davis last win the World Championship?
2. Colossus 4 Chess uses the chess piece which looks like a horse on the front cover. What is the correct name for this chessman?
3. The CDS Bridge program allows you to play by yourself. How many people do you usually need to play Bridge?

Rules.

1 All entries must be in by October 31, 1986
2 In the event of a dispute the judges' decision is final.
3 Readers outside the UK may not enter.
4 Only one entry is allowed per reader, but you may photocopy the form.

PC1512 contest entry form

Answers

1 ....

2 ....

3 ....

Send to: *CDS Competition, Amstrad User, 169 Kings Rd, Brentwood, Essex CM14 4EF*

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PCW Chess ☐ CPC Chess ☐
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SOFTWARE REVIEWS

KILLAPEDE



Arcade games are not all alien zapping and beating the hell out of Ninja warriors. Quite a while back Atari produced an arcade game called Centipede. Now the authors, Players, wouldn't approve of my saying that Killapede is a version of this classic for fear of legal beagles trying their luck at the intellectual copyright game. But they need not worry – they have changed and improved the game enough to be safe.

However the scenario is basically the same. You play the part of a little something at the bottom of the screen. You can move left and right over the full width of the screen and up and down about a fifth of the way. You are armed with an infinite quantity of knives which you throw at your assailants.

The action takes place in an insect-infested garden. Your main opponent is a centipede which zig-zags down the screen, descending a line every time it hits a mushroom *(Ugh, they have rooms for stuff like that - Ed)* or the side of the screen.

To kill the centipede you have to hit all the segments. Each segment thus destroyed then turns into a mushroom, which will assist the descent of the remains of the insect. Other sources of clutter include mushroom-laying fleas – who said it had to be biologically accurate? – spiders, very vicious ants and high speed snails.

You can remove all the clutter by shooting at the denizens of the garden, although it seems a bit odd that a butterfly which moves very slowly and is an easy target should be worth 2,500 points. The snail poisons the mushrooms it meets. When the centipede touches an afflicted mushroom it gives up and rushes straight for your domain at the bottom of the garden.

Mushrooms, toxic or othewise, can be destroyed with several well-aimed knife throws. When you lose a life each partially damaged mushroom magically restores itself and you are awarded five points, so when there are not too many aliens around it is a good idea to spray a few knives about and pick up the points postumously. A bit like insurance really.

Once a segment of centipede reaches the bottom row a ghost appears cannot be shot and will destroy you when he catches you. This acts to speed up slower players. You get a bonus life at every 10,000 points which makes the high score of 150,000 seem attainable. The *Amstrad Computer User* high score currently stands at around 70,000.

The computer announces the bonus life with some excellent digitised speech. This is so good that it can be understood without the usual screen prompt and hour of creative thought. Sampled speech is used at the start of a game and when the high score is displayed. This is just one of many touches which makes Killapede a classic game.

Author: Players
Price £2.99

Nigel

This is what it's all about! When you're bored with tortuous adventures, mega-graphics and the latest hype have this one ready. It'll restore your faith in the good old days.

Fast, colourful, noisy – in all the right ways – and soooo addictive it should be banned. The only thing to fault is the joystick handling - you have to define the game keys as the joystick before you play, and it's not immediately obvious how to do it. But that's a very minor niggle on a game that's terrific fun. A hit!

18/20

Liz

Players have started off on the right footing. As Interceptor Software they were known for their adventures and if Killapede is anything to go by then this budget label will dwarf that fame.

The old centipede trick of getting the foe to run the gauntlet down a tunnel of mushrooms did not seem to work as easily as it does in the arcade. I disliked the ants which run along the bottom of the screen making the game much harder, but I was impressed by the game as a whole.

18/20

Colin

The entymologist's nightmare returns! Flea for your life, or you'll get slugged. There's not mushroom in the forest, an' t'snaily all taken up with the creepy crawlies you can spy, dere in de undergrowth.

There are a couple of bugs in this feet of programming, but that won't louse up your enjoyment.

Can you beat all the high scores? This wonderful game motht deserve a place in anybody's collection, so you'd butter fly down to the shop and get it.

19/20

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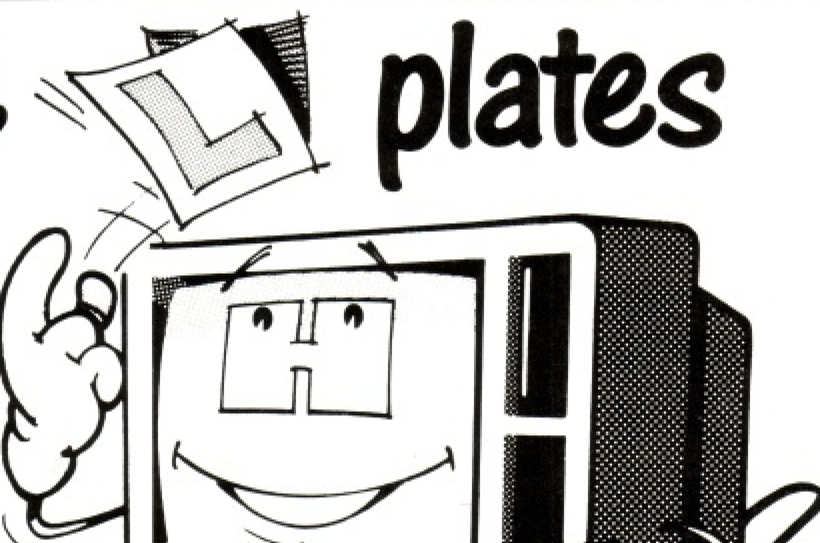
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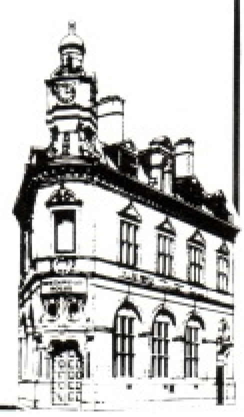
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STAR FIREBIRDS



This brings back memories of a spotty-faced youth wandering into an old arcade and discovering ... yet another version of Galaxians. 10p in slot, lasts as many seconds, pours coke over machine and exits stage left.

The brief instructions and hi-score table come up in the biggest text I have seen on the 464. Even Granny would be able to read it from the other side of the living-room.

Taking over the controls of your laserbase, you notice that moving to extreme left and right boosts you a little in the air. There must be some use for this. But wait – What's that coming out of the starry sky ?

Weird things dive at you, making as much noise as the Ed's little Jap sports car pelting down the M25. They drop wee bombs on you, thus proving you're not as immortal as you thought you were. Some really cunning ones even shoot sideways.

There are shotgun-type blasts to rattle your tail feathers, and bombs which don't take quite so much notice of the laws of gravity as the last lot, and descend slowly, exploding into a billion pieces of glittering shrapnel (well, at least six) which totally muck up your thoughts on what was and wasn't a safe place to be at the time. The score for blasting them is hardly worth the trouble.

Meanwhile strange beasties are still squealing around above, dropping little messages on you. By now most people have the brains to push the fire button. Peow! One shot. Breathtaking ohgodhurryup pause for the next shot. Darn! Too long – another one in the eye for immortality.

After a while this whopping great sprite slides on. This, methinks, is supposed to be some giant psychedelic sparrow. To me, it looks more like the north end of a south-bound baboon; but interpretations vary.

After pumping so many photons into it's ... er tail, that you're beginning to think that it's indestructable, it goes "Pouf!" (as they say in France) and increments your score accordingly.

Now for your secret weapon: Pushing up on the joystick causes your ship to develop the dreaded photo-orgasmotronic field; absolutely impervious to even south- bound baboons. While you float upwards, and things come downwards, the bits you meet on the way come off a lot worse than you do. Shame you can only pull that stunt a few times.

Eventually even the hottest sky-jockeys become history, and you consign your monica (only room for three letters here) to the annals of the high score table. Then you do it all over again until bed time.

Author: Firebird
Price: £1.99

Nigel

OK, so it's another Olde Wurlde arcade game. Somebody must like them, but there's a limit to the amount an already devastated reviewer's brain can take. This one works, has pretty flash Mode 0 graphics, and is only slightly more novel than Space Invaders. Once the pattern is sussed you can keep this up all night.

12/20

Liz

This brings back memories of getting to school late because I had popped into Greasy Joe's for a quick game of Firebirds. This Amstrad version has all the bits I remember from the original. It is basically Galaxian style with different types of alien.

I enjoyed this game partly for the nostalgia and partly because of its "Just one more game before I get on with some work", or maybe "Just one more try get the high score" appeal.

17/20

Colin

I am getting bored with spacey games. This title seems to be about two years too late for its own good, but at £1.99 I suppose you can't complain. The graphics are colourful and relatively smooth and the sound is OK. One thing annoyed me, and Firebird are by no means the only people to do it.When starting the game you can press the joystick fire button to select joystick or keyboard, but you then have to go back to the keyboard to select one or two players.

Could this not have been done using the joystick to save lazy people like me having to lean all the way to the keyboard?

14/20

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THRUST



Every game these days seems to need a 50 word plot. Does Space Invaders have a plot? Does chess? Of course not, and they seem none the worse.

So let's get Thrust's theatricals out of the way. The resistance is planning a grand attack on the Intergalactic Empire, and to this end have snaffled some starships. Unfortunately, they appear to be missing certain vital components, to wit, Klystron Pods. In the real world, klystrons are three element vacuum tube microwave oscillators, now largely superseded in low power applications by Gunn diodes – that'll impress your friends.

These pods are kept on supply planets and are protected by nuclear-powered limpet guns. Obviously the Empire is expecting an attack by radioactive shellfish. Instead they get... guess who. I thought you'd be pleased. Anyway, your task is to go in, grab the pods and escape to deep space.

To disable the guns you must fire at the atomic stations that provide the oomph. Too much, however, and the reactor goes critical. This results in the total destruction of the planet some 10 seconds later. And you were worried about Chernobyl.

This worldwide wipeout can be either a Bad Thing, if you haven't got the pod, or a Good Thing, if you have. In fact, there are bonuses for escaping a user-induced cataclysm carrying a klystron.

And that's just about that. In rasterised reality, you're guiding an Asteriod-style spaceship, built out of lines instead of being a solid sprite, over a bleak landscape. Gravity is a major factor, and you've got to actively and precisely use the ship's thruster to prevent yourself crashing into the ground.

Your ship also has an unhealthy helping of inertia, so unless you balance out each manoeuvre in a Newtonian manner you'll find yourself spread over the surface in no uncertain terms. Of course, you have a gun to shoot things with, and a tractor beam/shield. This performs three functions – it protects you from gunfire, makes the connection between you and the pod, and allows you to tap the fuel stores that are scattered here and there.

At first, the pods lie lightly defended on the surface, but as you progress they get hidden in more and more tortuously twisted caverns. And then things get really nasty. There are doors that slam shut, and reverse gravity which can make tootling down the A127 on a moped in the rush hour seem like driving a model train.

And there's something even more deadly waiting in the wings, but describing it would spoil the surprise *(This means he can't get further than the reverse gravity, but he can read the inlay card – Ed.)*

Once you've got the pod in tow it makes handling the ship much more difficult, and if the pod gets hit by a gun or bashed against a rock – easily done – then the ensuing extirpation does you no good at all. Assuming you escape unhindered from these hazards with your pod, then you're free – free to try the next, more devious, route to ruin.

Author: Firebird
Price: £1.99

Nigel

After a solid weekend of playing Thrust I am still addicted. Now that may not sound very much but when you have 20 games a month to play it is easy to be fickle and flit from game to game. Anything which keeps me playing at four in the morning has to be good.

When you first start to play each new screen looks impossible but you rapidly acquire the skills to get through it.

Thrust is a game where you learn by doing.

19/20

Liz

Simple and addictive, two of the elements which make a super game. Piloting an asteroids type ship – rotate left, rotate right thrust and fire – is a skill which most ancient arcade addicts have to a tee.

The game on which Thrust is based is Gravita, which featured deep space battle sequences and was a shade more complicated. Once you have mastered the control everything changes, reverse gravity is a swine. Disappearing landscapes are worse.

Thrust passes the "just one more game" test with flying colours.

19/20

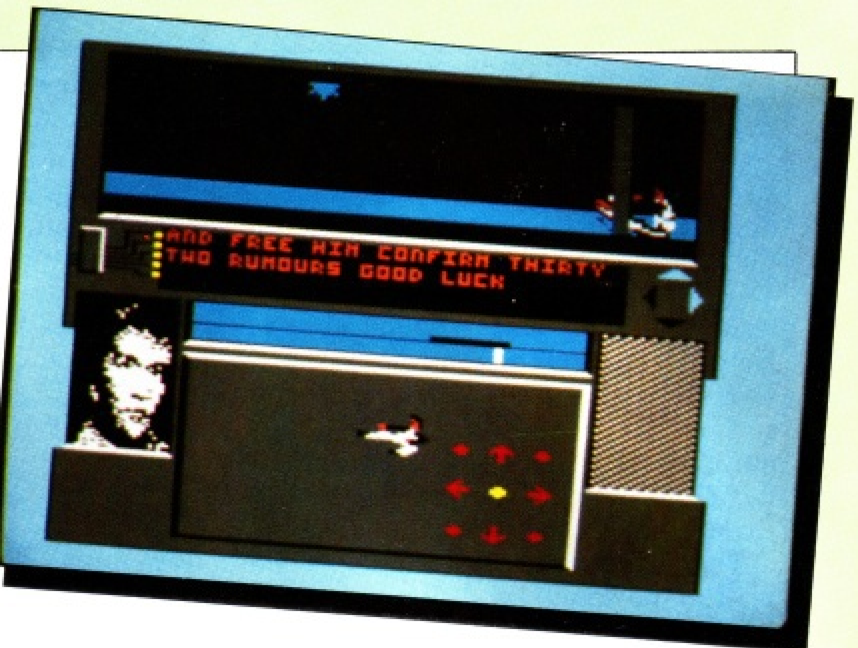
Colin

Firebird seems to be a little indiscriminate in its effort to grab the budget market. In the same month that the abysmal Helichopper abased the Arnold, Thrust thrilled this keytapper.

Taking a simple theme or two (Moon Lander, Asteroids and Gravita), Thrust proves that you don't need whizzo graphics or zillions of windows to produce a demanding and enjoyable game.

Maybe it's that the game always needs a little bit more skill and precision than you're capable of just now, but you've just got to keep playing. The lack of a joystick option deserves a raspberry.

19/20



NEXUS

The first thing about Nexus to grab the attention is the packaging. Resembling nothing so much as Ford Prefect's lunch box, it reflects the game itself – imaginative and difficult to classify. The story runs thus: An experienced journalist (yep, you again), with both word bashing and survival skills, is suddenly called into the editor's office. It seems that a buddy of yours was investigating a drugs racket in Colombia when the baron thereof caught wind of his sniffing around and promptly kidnapped the hapless hack.

Your mission is to enter the drug ring's HQ, jump the jailed journalist and in the process garner enough gen to give the editor a scoop story for the next day's Clarion. To help you in this last task the Ed gives you 32 clues. These relate to items of information scattered (as always!) around the Colombian centre.

The HQ is a sprawling, multi-level complex which you enter via a river on what looks like an aquatic C5 (Sea 5?). Once in you meet Tony, a member of Nexus (nothing to do with Blade Running). This is an undercover operation bent on busting the drugs ring from within, and as such the Nexians are quite happy to help you.

This help can take the form of advice, weapons or skills. All of these you need, as, apart from the details above, you know very little when you start about the mess you're getting yourself into. There are two ways of doing things – either try to move as silently around the complex as possible, get the info, transmit it back to base and get your friend, or get in and out as fast and as messily as possible. This last might not get you a very high score, but it could be more fun!

So much for the plot, now how about the pixels? To match the complexity of the game the screen is divided into seven areas. At the top is a window which shows where you are and what you're doing with whom. The characters in the game are large, well animated figures that lollop along against a detailed backdrop of walls, doorways, fixtures and fittings.

There's another area on-screen which displays a digitised picture of characters' faces. It's nothing spectacular, but individuals are recognisable. There's a text window, where conversations take place, and the results of some of your actions are displayed. Radar and character ID are also shown, as is a locator. This is a kind of compass which points towards a person or object you wish to find.

The biggest window is concerned with control of your persona. As the game is flown by joystick and joystick alone, this area is important. By suitable manipulation, your sprite can run, walk, crouch and use a goodly selection of Kung Fu footwork upon anybody who crosses its path. Once weapons have been located, these too can be pressed into service.

Pushing the stick up and pressing Fire puts you into a command menu, where all the actions available are listed. All of these are actioned by just one flick of the stick, so the whole system is fast and doesn't impede the flow of the game. But it is easy to move the wrong way at first.

That's just the bare bones of a complex and detailed game. As said at the beginning, it defies classification. But call it an arcade adventure/strategy/martial arts thrash, and you won't be far wrong.

Author: Nexus
Price: Tape £9.95, Disc £14.95

Colin

I always wanted to be a journalist. Instead I write for *ACU*. If I worked for the Clarion, it seems, I could be having a crack at the drug barons. But this game is almost as much fun as being there. Lots of action, lashings of detail, ideas aplenty.

The music adds to the game – after an hour at the joystick I didn't feel the need to turn it down. The fight sequences are beautifully done as well, you can almost feel the pain as a foot smashes into your jaw. Just the game to waste a week over.

16/20

Liz

This is nearly, very nearly a brilliant game but it fails by trying too hard. It reminds me of those compendium things you get at Christmas. There are lots of little games and counters everywhere but you never get down to actually doing anything.

You look at the scrolly bit at the top which is a cross between Kung Fu Master and V, then you find a terminal and play with that, look at all the pictures for a bit, then you start hitting the people who are supposed to be on your side. All the little bits are pretty but the game is not much fun.

8/20

Nigel

This game has good animated graphics and the latest trendy icons and menus, which give it credibility in these cynical times. As a journalist you must free your friend from the clutches of a drugs ring with the aid of machine guns and grenades which have to be found by exploring the area. This is not an accurate simulation of a journalist's life, I think!

Nexus is a complex game of many aspects. Part strategy, part mapping, part combat, it is difficult to get into but easy to play. It's just the sort of thing to keep you amused for a few hours.

15/20

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HELICHOPPER

In case your mother never told you, a word of advice. Avoid Blue Stilton and pilchard sandwiches. Especially with Tabasco. In a fit of boredom, I concocted just such a snack, and settled down to watch Fire Fox on the old video.

Having consumed said comestibles, I started to nod off. I awoke with a start, not in the living room but at the controls of a Mk IV Haddock, the deadliest helicopter ever built. I looked out of the window. Below me was a steaming, stinking swamp where thick bubbles of noxious gas belched to the surface and lazily plopped open.

Stifling thoughts of British Rail coffee, I reached for the radio. "Hello Control", I shouted, "what's going on?". The voice crackled back: "Don't let us down now. See that compound in the distance, with the high fence? That's a top secret research station, where Professor Fay K. Germanaccent has been developing a new type of clone.

"You have to rescue the clones and return them to the Clone Transporter on the other side of the swamp".

"Is that all?" I gasped, still thinking of BR catering. "No, of course not", said the radio. It cackled horribly and continued: "Some of the professor's other experiments have escaped to the swamp, and just happen to have a helicopter phobia. They'll attack you on sight."

"Thank God I'm in a Haddock", I sighed. "Don't sigh too soon", Control giggled. "All you've got is bombs. We've disabled the lasers, guns, cannon and anything else that might help you. You're doomed. DOOMED! Hahahahahaha!". Control had never been the same since we'd slipped him that ginseng cigarette...

I was on my own. Looking through my bomb sights I saw what looked like psychadelically coloured eggs rising up towards me. I thumbed the bomb release button, and watched the monsters die unborn in a cloud of chromatic coruscations. The fence loomed. I landed the chopper, and noticed that the electricity in the fence scared away the Things from the Swamp.

Somewhat relieved, I opened the door as a clone plodded towards the craft. It hopped in, and I took off, swinging in a tight arc towards the thick air above the morass. Halfway across, a swarm of monsters attacked from above. My God, I thought. They look just like plastic ducks. But the gleam in their eyes was most un-ducklike.

Somehow I managed to avoid them and put the chopper into the clone transporter. The clone bumbled out, and I was faced with another journey across that deadly bog.

The rest of the mission faded into a blur until I realised that my time was up. A host of evil, multicoloured monsters hovered around, leering unpleasantly and humming the Crossroads theme tune. They made a dive for the copter and I span down, down, down...

I sat bolt upright in my armchair. The television hissed at me. It was two in the morning, and it had all been a cheese-induced nightmare. My stomach turned at the thought of that coffee. Still, hadn't Edgar Allen Poe made good use of drug-inspired trips?

Of course the modern equivalent of the horror novel is the budget computer game, and this had been pretty horrific. I dismissed the thought almost as soon as it crossed my mind. Nobody would buy that. I shrugged my shoulders, and went upstairs to bed.

Author: Firebird
Price: £1.99

Nigel

The first practical helicopter was built by Igor I. Sikorsky in 1939. This fact is of considerably more interest than the tedious uninspired grot called Helichopper.

Even making the joystick work is almost impossible as you have to go to the redefine keys section and use the cursor keys to make the definitions, and the snappy loading tune can't mask the fact that this boring Amstrad game was once a boring Spectrum game.

Just 'cos it's difficult to play doesn't make it fun, Firebird. It might cost a mere two quid, but compared to the latest Mastertronic offerings it seems grossly overpriced.

4/20

Liz

Firebird must be planning another "Don't buy this" compilation of the worst software they have had submitted. Unfortunately the duplicators screwed things up and packaged this one as a real Firebird game.

Nigel described the game as a "fright simulator", but I would describe it as (censored - Ed), although I'm not as subtle as he is. You may complain that this review doesn't actually tell you much about the game but that's because we didn't want to bore you as much as Helicopter did us.

2/20

Colin

Another Firebird creation that musics while it loads. Flash, but not as pleasant as Spikey Harrold. Once inside, it is very definitely a budget game.

Flog this for more than a couple of quid and you'd be lynched. After the loading music and disolving title screen, the lack of sound effects and measly graphics really hits you.

On several occasions I swear that the little man I rescued just didn't want to get off the helicopter, no matter how white the landing pad got. Very definitely a cheepie from Firebird.

6/20

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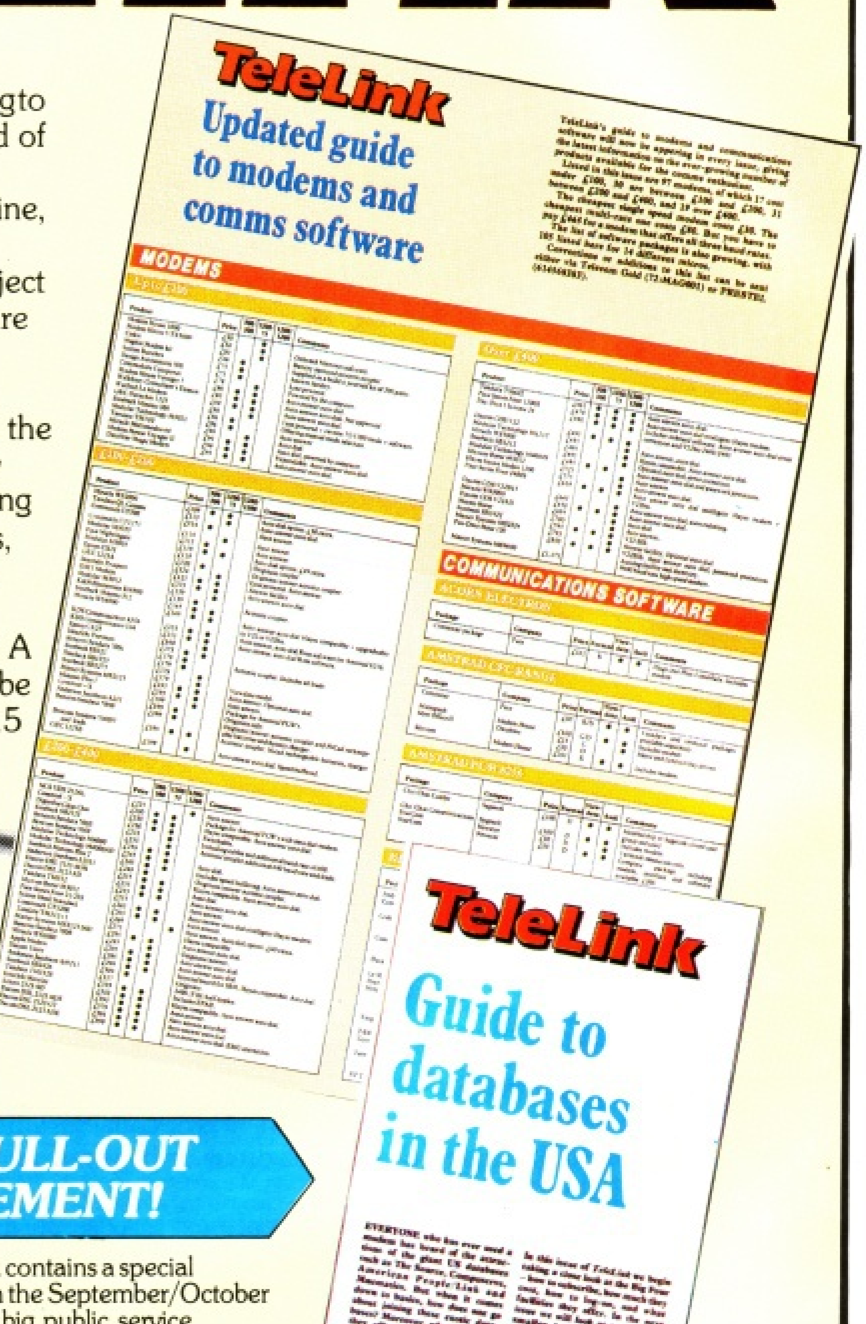
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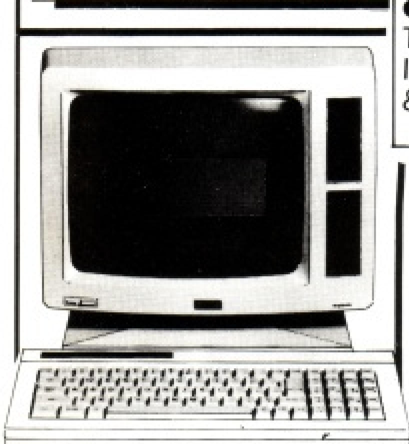
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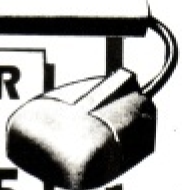


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To accompany the new PC they have indulged in a new image. The reception has been resigned. If the aim of the new reception was to look different then it has certainly been a success. The £1,000 main desk looks like a prop from Star Trek, in keeping with the sci-fi (not the hi-fi) image. It may have been a good idea to have ordered a desk with some shelves.

The area has been divided by frosted glass partitions which give a passable impression of Hampton Court while keeping the reception light and airy. The white walls have been papered with a pale blue and white pattern and the grey titles replaced with better, dark blue ones.

No expense has been spared. Rumour has it that the chairs were specially ordered from Italy. They look as though they were made in an air bed factory and are quite comfortable.

The most recent indulgence takes the form of two pot plants. They cost a reported £460. But the most remarkable are the chameleon lift doors.

The lifts have been carpeted, not just the floor but the walls as well, with dark blue tiles, the lift ceiling has been papered with the marbled blue stuff which adorns the ground floor walls.

The doors, like the lift from Hitch-hikers Guide to the Galaxy, cannot decide what colour they want to be. Once upon a time the doors were silver, then they went electric blue, had a quick flirt with brown and now seem to have settled down as a pastel blue.

The overall effect takes some getting used to. You have to remember to press the buttons in the lift instead of grabbing a handle and saying "Bridge" or quoting the immortal line: "Beam me up Scotty", but it is all quite plush.

Quickie compo

Sighted: The much rumoured CPC 464/664/6128 firmware manual. Now you can share in the machine code delights of all the CPC computers. Cuddly Mike Mordecai has offered the Least Significant Bit a dozen Soft 968s to give away. The first 12 readers to write in with a good enough reason why they should have a copy will get one of the prizes.

Ooops

This is where we tuck away the mistakes, on the back page in the hope that you won't realise that we did something wrong last month. The problem concerns the Haunted House listing. The actual program was OK but the text with it contained a slight boo-boo. The instructions for saving the machine code should have read:

SAVE "HHCODE",b,30000,4800

Sorry.

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Help feature — Optional on screen command summaries.

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2 SAVE text file	4.9	18.9
3 Re-FORMAT paragraph (85 words)	0.4	15.3
4 Re-FORMAT entire text	2.5	Not Possible
5 Move directly to start of text	under 0.1	2.2
6 Move directly to end of text	0.2	2.2
7 REPLACE 'the' with 'THE' (45 occurances)	1.7	34.1
8 SCAN entire text	2.2	7.2
9 MERGE file to centre - of text	4.0	Not Possible
10 MERGE file to end of text	3.8	12.4
11 MOVE 85-word paragraph	under 0.1	6.8
12 PROGRAM LOAD TIME		
DISC	12.9	14.6
ROM	Instant	Not Available

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6128 OWNERS
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PROSPELL

★ Checks your spelling ★ Proof reads your documents ★
★ Solves your word puzzles ★

— How to use PROSPELL —

The spelling checker can be called directly from within PROTEXT to check the curre file in memory or any file on disc. Alternatively, PROSPELL will check any ASCII produced by other Amstrad word processors, including Wordstar type files.

— Features available —

Add words to the dictionary/Correct word/ignore word/Look up correct spelling/Vi word in context/Delete words/List words/Initialise new dictionary....PLUS....

— Word Puzzle Features —

The 30,000 word Dictionary can be used in a number of useful ways.

FIND WORD — Your can enter a word pattern using ? for an unknown letter and * fo group of unknown letters. PROSPELL will list all words in the dictionary which ma this pattern.

ANAGRAMS — PROSPELL will even list all anagrams of any word pattern you type

Together these features will prove invaluable to crossword solvers and compiler

— THE POWER OF PROSPELL —

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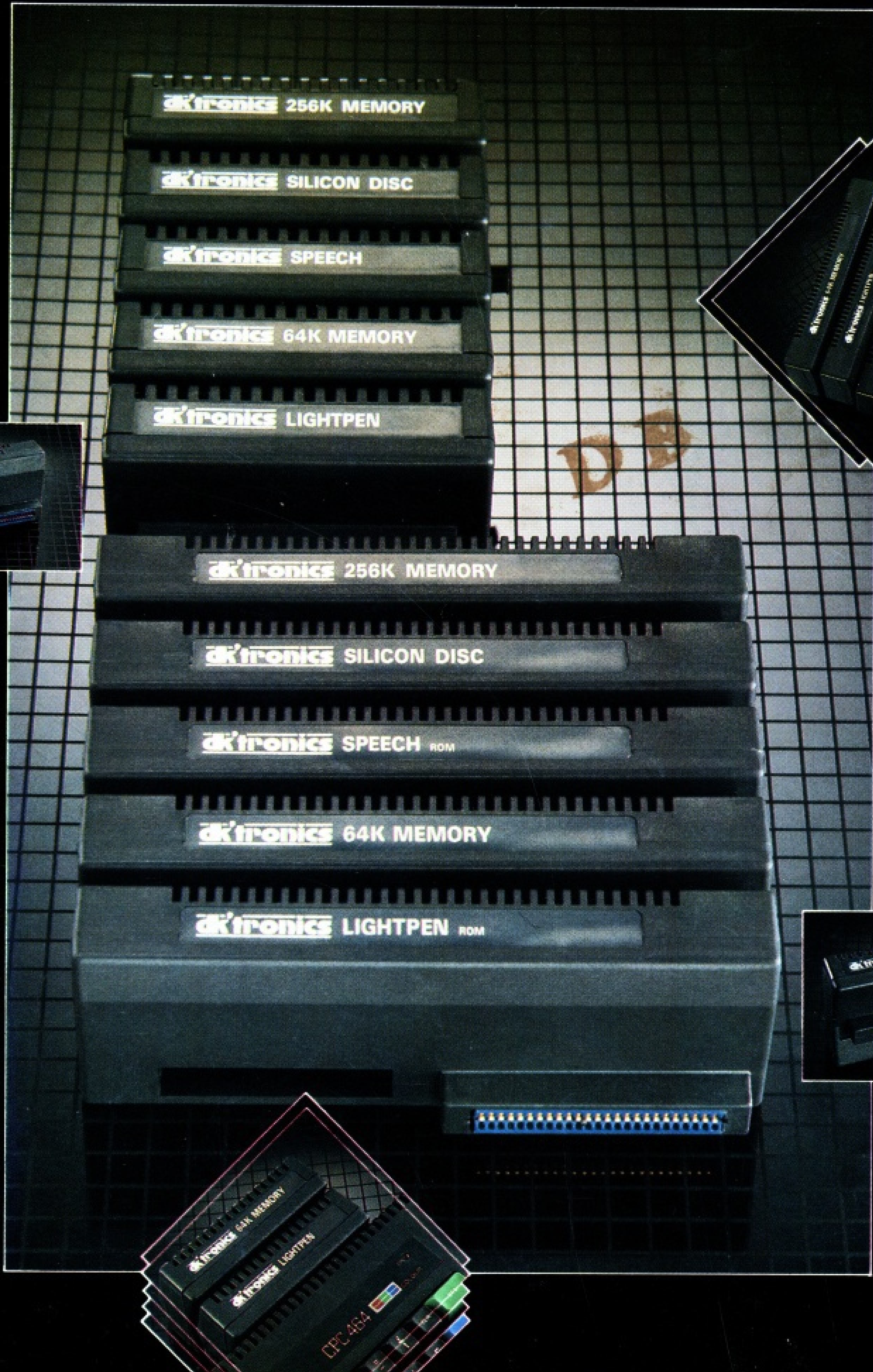
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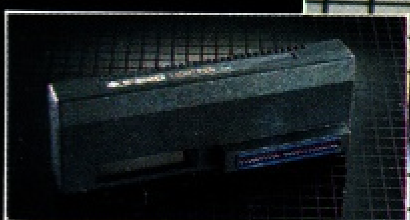
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